

# Report

PHIBRO-TECH, INC.

JANUARY 2000

QUARTERLY SAMPLING REPORT

Santa Fe Springs, California

April 17, 2000

*Prepared for:*

Phibro-Tech, Inc.

8851 Dice Road

Santa Fe Springs, California 90670

*Prepared by:*

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April 18, 2000

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Dear Ms. Chou and Messrs. Leach and Kou:

Enclosed is the **First Quarter 2000 Quarterly Groundwater Monitoring Report** for Phibro-Tech, Inc., Santa Fe Springs facility. The Report includes analytical results and physical measurements obtained January 18-20, 2000 from selected monitoring wells at Phibro-Tech. Since this Report includes portions of the RCRA Facility Investigation (USEPA Docket No. RCRA 09-89-0001), this Report is also submitted to EPA.

Based on a technical review by our consultant, Camp Dresser and McKee, a groundwater monitoring program is included which was implemented beginning with the April 1991 groundwater monitoring. Additional wells and parameters changed at the request of EPA are included in this Groundwater Monitoring Report. The changes are described in the Report. Please contact me if you have any questions or comments concerning this Report.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'E. E. Vigil', is written over a light-colored background.

E. E. Vigil  
Environmental and Safety Manager

EEV/kn/qtrgrdwtrrpt  
Enclosure

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# PHIBRO-TECH, INC.

## JANUARY 2000 QUARTERLY SAMPLING REPORT Santa Fe Springs, California

April 17, 2000

*Prepared for:*

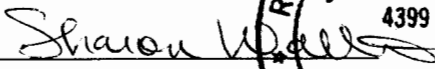
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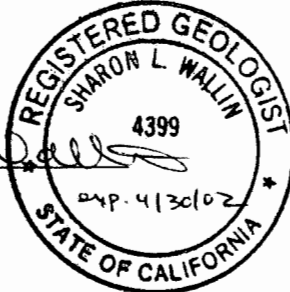
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The information contained in this report has received appropriate technical review and approval. The activities outlined in this report were performed under the supervision of a Registered Geologist or a California Professional Engineer.

Reviewed and Approved by:

  
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Project Manager



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# Section 1

## Introduction

This report summarizes the 55th RCRA quarterly groundwater monitoring sampling and analyses period at the Phibro-Tech, Inc. (PTI), Santa Fe Springs, California facility (formerly referred to as Southern California Chemical). Contained herein are the results of laboratory analyses of groundwater samples and water level measurements obtained during the period of January 25 through January 28, 2000.

The purpose of the groundwater sampling program, which began in March 1985, is to determine if compounds of concern detected in groundwater beneath the site are migrating from the facility. This is accomplished through the comparison of background or up gradient water quality and groundwater quality beneath the site. Statistically-significant increases in contaminant concentrations between known areas of groundwater contamination and downgradient wells would indicate that migration is occurring. In the past, statistical analysis was performed annually and was included in the July quarterly monitoring reports. Statistical analysis is now conducted each quarter and is included in the corresponding monitoring report. The January 2000 statistical analysis is contained in Appendix E of this report.

To date, three types of contaminants have generally been detected in the groundwater beneath the site: soluble metals (primarily chromium and cadmium), purgeable aromatic organic compounds (toluene, ethylbenzene and total xylenes) and purgeable halogenated organic compounds (i.e., solvents, primarily trichloroethene [TCE]). Groundwater modeling completed in January 1993, and groundwater monitoring conducted since 1985, indicate that the purgeable aromatic plume originated up gradient from the PTI facility. The distribution of TCE appears to be ubiquitous, however, somewhat elevated concentrations exist in the vicinity of Pond 1, a RCRA-regulated former surface impoundment area. Elevated concentrations of soluble metals have also been consistently detected in the vicinity of Pond 1. Soluble metal concentrations at the down gradient property line and in deeper wells, however, continue to be negligible to non-detect.

Approximately 15 years of quarterly groundwater monitoring at the PTI facility has indicated a general lack of hexavalent chromium migration. During groundwater modeling performed by CDM in 1993, a retardation factor of 50 was selected based on the observed distribution of hexavalent chromium in the groundwater. Previous data analysis indicated that the most likely basis for the relatively high (but within the range of reasonable and appropriate values) retardation factor would be the existence of reducing conditions in the saturated zone, promoting the conversion of hexavalent chromium to trivalent chromium ( $\text{Cr}^{3+}$ ). Trivalent chromium, having a very low solubility in water, would tend to precipitate and sorb to the soil, limiting migration. During four quarterly sampling events conducted in 1996, additional laboratory analyses (iron and redox potential) were performed on groundwater samples collected from wells MW-04, MW-09, and MW-14S. These additional data, along with the pH, total chromium, and hexavalent chromium data, provided a better

understanding of the mechanisms controlling chromium migration in groundwater underlying the facility and supported the above hypothesis. Please refer to Section 6.4 (Chromium Fate and Transport) of the October 1996 Quarterly Sampling Report for a detailed discussion of this conclusion.

In addition to the data obtained during the January 2000 sampling, this report contains tables listing detection limits of the parameters analyzed (Appendix A). Copies of the original laboratory results are included in Appendix B. Chain-of-custody records for the January 2000 sampling are included in Appendix C. Appendix D contains background groundwater concentrations of contaminants for the Santa Fe Springs area for the year 1998. Appendix E contains the complete quarterly statistical analysis.

Prior to October 1993, quarterly reports have included analytical result summary tables from all previous sampling rounds. Starting with the October 1993 quarterly report, historical water quality data tables are no longer included in the report as an appendix. Please refer to Appendix B in the July 1993 Quarterly Sampling Report for a summary of historical groundwater analytical data. A summary table of key historical results since January 1989 is provided in Section 6 (Table 6-1) of this report.

## Section 2

# Monitoring Well Sampling

Groundwater sampling, utilizing existing on-site monitoring wells, was conducted by CDM personnel during the period of January 25 through January 28, 2000. Field activities were performed in general accordance with the groundwater sampling protocol as outlined in Section 4.3.3 of the approved RCRA Facility Investigation (RFI) Work Plan (CDM, June 1990). Prior to the submittal of the RFI Work Plan for regulatory agency review and approval, the J.H. Kleinfelder and Associates (Kleinfelder) Quality Assurance Project Plan (QAPP, May 1988) was used as the primary groundwater sampling guidance document. Proposed deviations from the RFI Work Plan (i.e., well purging using a submersible pump and sample collection using disposable bailers) were discussed in October 1994 correspondence to the DTSC. These changes were implemented during the October 1994 and all subsequent sampling events.

Twenty-four monitoring wells exist on-site. The locations of these wells are shown on Figure 2-1. One well, MW-06A, historically has not been sampled for groundwater analysis because it is screened in the Gage Aquifer, which is unsaturated below the PTI facility. The remaining wells are screened in the Hollydale Aquifer; 16 in the upper portion and seven in the lower portion of the aquifer.

Beginning in February 1985, Kleinfelder initiated groundwater sampling, utilizing monitoring wells MW-01 through MW-06B. Six additional wells (MW-04A and MW-07 through MW-11) were installed at the site in July 1985, thereby increasing the total number of active wells to 12. Quarterly sampling of the 12 wells was initiated in March 1986.

Commencing with the January 1989 sampling event, CDM has been responsible for all groundwater monitoring activities at the facility. Ten wells (MW-01D, MW-06D, MW-12S, MW-12D, MW-13S, MW-13D, MW-14S, MW-14D, MW-15S and MW-15D) were constructed as part of the first phase of the RFI program and were first sampled during the October 1990 sampling round.

Groundwater analysis of the 22 wells which existed during the RFI program from October 1990 to January 1991, indicated that the number of wells sampled could be reduced and yield comparable results to sampling all the wells. During the April, July, and October 1991, and January 1992 sampling rounds, the 11 wells sampled included 8 wells (MW-01S, MW-03, MW-04, MW-07, MW-09, MW-11, MW-14S, and MW-15S) screened in the upper portion of the Hollydale Aquifer and three wells (MW-01D, MW-04A, and MW-15D) screened in the lower portion of the Hollydale Aquifer.

Beginning with the April 1992 sampling round, three additional wells (MW-06B, MW-06D, and MW-16) were included in the quarterly monitoring program, bringing the total number of sampled wells to 14. A new well, MW-16, constructed in March 1992

as part of the Phase II RFI program, was sampled for the first time during the April 1992 sampling round. The same 14 wells have been sampled during all subsequent sampling rounds. On several occasions, additional laboratory analyses have been performed and additional wells included in quarterly sampling, at the request of the U.S. EPA. Additional analyses and wells are noted in the comments column of Table 2-1, which summarizes the groundwater monitoring program at the site.

The 14 wells currently included in quarterly sampling are MW-01S, MW-01D, MW-03, MW-04, MW-04A, MW-06B, MW-06D, MW-07, MW-09, MW-11, MW-14S, MW-15S, MW-15D, and MW-16. Ten shallow and four deep wells are analyzed for pH, metals (cadmium, chromium, and copper using EPA Method 6010A; and hexavalent chromium using EPA Method 7196), and purgeable halogenated/aromatic organic compounds (EPA Method 8260). A detailed listing of analytical parameters per sampling event is provided in Table 2-1.

Beginning with the July 1993 sampling event, the 14 wells have generally been purged and sampled in the following order: MW-01, MW-01D, MW-03, MW-11, MW-06B, MW-06D, MW-07, MW-04A, MW-04, MW-14S, MW-15S, MW-15D, MW-16, and MW-09.

## 2.1 Sampling Procedure

Field sampling was conducted in general accordance with procedures detailed in the RFI Work Plan. Sampling practices included efforts to detect floating product and hydrocarbon vapors at each well, measurement of the static water level and total depth of each well for calculating pre-sampling evacuation volumes, purging and sampling of groundwater for laboratory analysis, decontamination of sampling equipment, and handling of sample-filled containers in accordance with Section 4.3.3.5 of the RFI Work Plan. In general, these procedures were consistent with previous quarterly sampling by Kleinfelder. Details of previous procedures have been discussed in prior Quarterly Sampling Reports.

### 2.1.1 Organic Vapor Check

Standard field procedures include checking the interior of each well with a photoionization detector (PID) (equipped with a 10.0 eV lamp) for the presence of organic vapors whenever the well casing is opened. With the sampling team members standing upwind of the well, the well cap was opened slightly, allowing for the insertion of the PID probe tip inside the well. Readings were monitored until they stabilized, which was usually at zero parts per million (ppm). The final reading, as well as the peak reading, were recorded in the field log book. The cap was then removed and the well allowed to vent for a short period of time prior to measuring the static water level. The maximum PID readings taken during the collection of water level measurements are shown in Table 5-1 in Section 5.

### 2.1.2 Detection of Immiscible Layers

In order to detect the presence of floating, immiscible layers on top of the groundwater surface, a clear bailer was lowered approximately one-half the length of the bailer below the surface of the water in each well. The bailer was removed from the well and its contents checked for immiscible layers or iridescence. The bailer was decontaminated and the sampling line discarded after each use. If immiscible fluids had been detected, a sample would have been collected for laboratory analysis of purgeable halocarbons and aromatics (EPA Method 8260) and total petroleum hydrocarbons (California Department of Health Services [CA DHS] Method) using a new bailer. As in all previous quarterly groundwater sampling at the PTI facility by CDM, immiscible layers were not detected during the January 2000 sampling event.

### 2.1.3 Static Water Level/Well Depth Measurement

On January 25, 2000, prior to the initiation of on-site well pumping, the static water level at 22 of the 24 on-site wells was measured three times at each well location with a decontaminated electric water level indicator (sounder) and recorded. The measurements collected in the wells were identical, therefore, there was no need to collect additional measurements or average the data of these wells. The results of these measurements are shown in Table 5-1 and discussed in Section 5. One well (MW-06A) was dry, and MW-02 was not measured due to its proximity to MW-12S.

The water level in each well was also measured immediately prior to initiating well evacuation procedures for calculation of well purge volume. During measurement, the measuring (reference) point used was noted (i.e., the top of the steel casing), and the depth to water below the reference point was measured to the nearest 0.01 foot and recorded in the field log book. Well head elevation data was used with depth to water measurements to calculate groundwater elevation at each well location.

The bottom of each well sampled was also measured with the sounder to the nearest 0.1 foot. The amount of fill material in the bottom of the well was calculated from well construction data and noted in the log book. Prior to first use, the sounder was calibrated and the meter response checked. The sounder probe and line were decontaminated after each use.

### 2.1.4 Purge Volume Determination/Well Evacuation

Saturated casing volume was calculated at each well by using the depth to water and bottom sounding measurements obtained immediately prior to purging, to calculate the amount (height) of the saturated well casing. The inside diameter of the casing was then measured, and the following formula applied:

$$\text{Volume} = \pi \text{ radius}^2 \times \text{height}$$

A minimum of three saturated casing volumes of water were evacuated from each well prior to collecting a groundwater sample for laboratory analysis.

During the January 2000 sampling round, all 14 of the wells currently monitored were purged using a Grundfos 2-inch diameter submersible pump, and each well was sampled using a new disposable bailer.

For measurement of field parameters during well evacuation, a LeMotte Model 2020 turbidity meter, an Orion 250A pH meter, and a YSI Model 33 electrical conductivity (EC)/temperature meter were used. The instruments were calibrated or field checked prior to use with standard solutions in accordance with manufacturer's directions. The meters are used to determine the stability of discharge water field parameters prior to collection of a sample for laboratory analysis.

Periodically during well evacuation, the field parameters of the discharge water were measured and recorded in the log book. The physical appearance of the water (turbidity, color, sediment content, etc.) was also noted and recorded. Initial field turbidity measurements generally ranged from 1.3 to 1,100 NTUs (nephelometric turbidity units) at the start of well evacuation. At the end of well evacuation, measurements were generally less than 10 NTUs. Higher turbidity at the start of purging seems to be related to agitating the water column and resuspending material from the bottom of the well during pump installation. After a minimum of three saturated casing volumes of water were evacuated from each well and the field parameters stabilized (change between readings of less than 5 to 10 percent), a sample for laboratory analysis was collected.

All purge water collected from each well was discharged directly into 55-gallon barrels for treatment by PTI in the facility's wastewater treatment system.

### 2.1.5 Sample Collection and Handling

Groundwater samples were collected with a new disposable bailer from the approximate middle of the perforated section, and poured directly into previously-labeled sample bottles. During sample collection, the bailer was carefully and gently lowered past the air/water interface to minimize agitation and aeration of water during sample collection. The sample bottles were placed inside plastic zip-lock bags and then placed immediately into an ice-cooled chest. Prior to shipment, the bottles were cushioned with bubble wrap or plastic bags to avoid breakage. Samples collected for total metals analysis were field filtered using a 0.45 micron filter. A volume of groundwater equal to two times the capacity of the filtering device was passed through the filter and discarded prior to filtering each sample for metals (Cd, Cu, and Cr) analysis. Filters were discarded after each use.

The January 2000 groundwater samples were collected for laboratory analysis of the following parameters:

- Halogenated/Aromatic Volatile Organic Compounds by EPA method 8260
- Metals (Cd, Cu, and Cr)

- Hexavalent Chromium (Cr+6)
- pH

Groundwater sample bottles were numbered using the following format:

PTI-MW01S-046

Where:

- |       |   |  |
|-------|---|--|
| PTI   | - | designates site acronym                                  |
| MW01S | - | designates sample location number (MW = Monitoring Well) |
| EB    | - | designates equipment blank sample                        |
| TB    | - | designates travel blank sample                           |
| 046   | - | designates sequential sample number (per sampling event) |

This was the 45th round of sampling conducted by CDM, however, due to a previous labeling inconsistency, a 046 sequence number was assigned to all groundwater samples collected during this round. Sample label information included date and time of sampling, CDM sample number, and analytical parameters.

All filled sample containers that were collected from each well were accompanied by chain-of-custody forms that indicated the label information as well as the responsible person during each step of the transportation process. All samples were sent by courier to Quanterra Laboratories in Santa Ana, California on the day that they were collected, and a copy of the chain-of-custody form for that day was retained by CDM field personnel. Copies of completed chain-of-custody forms are included in Appendix C. The laboratory was notified at the time of delivery that one or more hexavalent chromium (Cr+6) sample(s) were contained in the shipment to ensure that the samples would be analyzed within the prescribed 24-hour holding period.

## 2.2 Equipment Decontamination Procedures

The following sections describe the procedures utilized to decontaminate groundwater sampling equipment.

### 2.2.1 Sampling Pump/Lines Decontamination

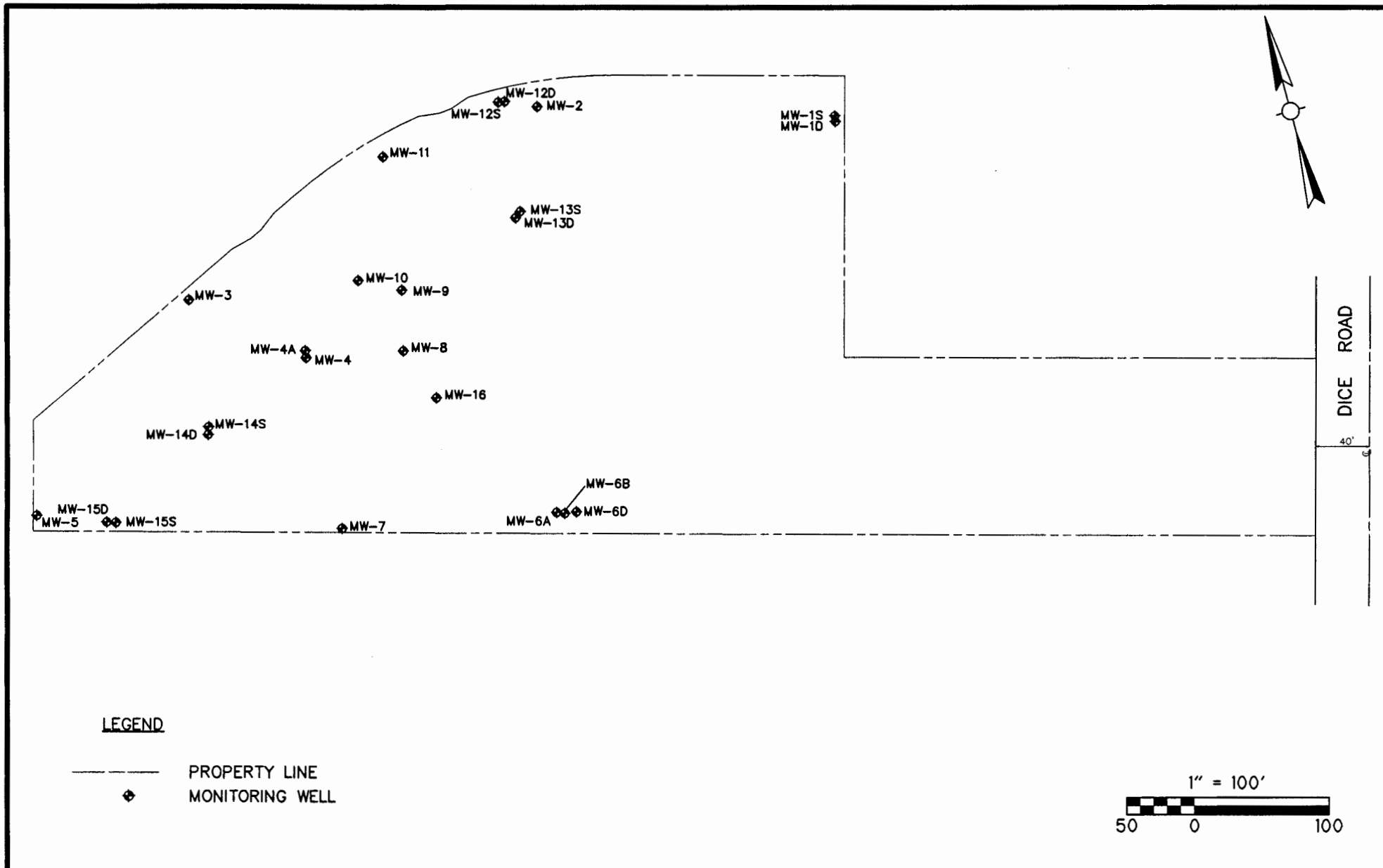
The submersible pump and discharge tubing used for well purging were decontaminated to reduce the possibility of cross-contamination between monitoring wells. The first step in the decontamination procedure was to submerge the pump into a decontaminated 5-gallon bucket containing a soap (Alconox, a laboratory-grade detergent) and water mixture, and pump at least five gallons of the solution through the system. The pump assembly was then submerged in another 5-gallon bucket filled with tap water and at least 10 gallons were pumped through the system. The final decontamination step was accomplished by submerging the pump into a

decontaminated 5-gallon bucket containing deionized (DI) water and pumping approximately five gallons of DI water through the system.

The exterior of the pump and discharge tubing was steam cleaned, as well as the exterior of the reel holding the tubing. The decontamination of the exterior pump line was performed over a plastic waterproof tarp. The tarp was placed on a gently sloping surface and bermed up at the edges, allowing the decontamination water to flow away from the equipment being cleaned. The spent water was recovered and stored in 55-gallon drums for treatment by PTI in the facility's wastewater treatment system.

### **2.2.2 Accessory Sampling Equipment Decontamination**

Accessory sampling equipment such as the metals filter apparatus, bailer, and water level sounder were also decontaminated to minimize the possibility of cross-contamination between the monitoring wells. The filter apparatus, bailer, and sounder were decontaminated first by washing in a bucket of soap and water, followed by a tap water rinse, followed by a final DI water rinse. Bailers used to test for an immiscible layer were decontaminated and reused. The bailers and nylon rope that were used to sample wells were discarded immediately after use.



PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

## MONITORING WELL LOCATION MAP

**CDM**environmental engineers, scientists,  
planners, & management consultants

TABLE 2-1  
PHIBRO-TECH, INC.  
Groundwater Monitoring Program Summary

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
3/85	Quad	Cu & Zn	X	X	X	--	--	Sampled wells MW-1, 2, 3, 4, 5, & 6B. Sulfide, nickel, copper and zinc requested by DOHS and RWQCB. Also Appendix III parameters and water quality parameters (see footnote).
7/85	Quad	Cd, Cr	X	--	X	--	--	Sampled wells MW-4A, 7, 8, 10 and 11
3/86	Quad	Cu & Zn	X	X	X	--	--	Sampled 12 wells (MW1, 2, 3, 4, 4A, 5, 6B, 7, 8, 9, 10 & 11). Also Appendix III parameters and water quality parameters (see footnote).
7/86, 9/86, 12/86	Quad	Cd, Cr, Cu, Zn	X	X	X	624	--	Sampled all 12 wells (as previous)
3/87	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Sampled 11 wells, <u>not 4A</u>
7/87, 10/87, 2/88	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	After July 1987, all 12 wells were sampled during each event
6/88	X (not Quad)	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis (t-test) on Indicator Parameters (IPs).
9/88	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	IPs & volatile organics from MW1, 2, 4A, 5, 6, 7 analyzed semi-annually in June/Dec.
1/89	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	After Jan. 1989, volatile organics analyzed for all 12 wells.
4/89	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
7/89	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis of Jan. thru July 1989 data (IPs, total and hexavalent chromium).
10/89	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
1/90	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
4/90	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	

TABLE 2-1  
PHIBRO-TECH, INC.  
Groundwater Monitoring Program Summary  
(continued)

7/90	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis of Jan. 1989 data (IPs, total and hexavalent chromium).
10/90	--	Cd, Cr, Cu, Fe, Ni, Pb, Zn	X	X	X	601/602	X	Sampled 22 wells, Appendix IX parameters analyses were performed on wells 4, 4A, 6B, 6D, 12S, 12D, 15S, 15D, plus a duplicate of 4.
1/91	Quad	Cd, Cr, Cu, Fe, Ni, Pb, Zn	X	X	X	601/602	--	Sampled 22 wells.
4/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	New sampling program was initiated. Sampled 11 wells including wells MW-01S, MW-01D, -03, -04, -04A, -07, -09, -11, -14S, -15S, -15D.
7/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	Performed annual statistical analysis.
10/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	
1/92	pH only (all) TOC only (MW-01 & -04)	Cd, Cr, Cu	X	--	Ammonia as nitrogen (MW-01 & -04)	601/602	--	Ammonia & TOC analyses added at MW-01S and MW-04.
4/92	pH only TOC only (MW-01, -04, -09, -14S)	Cd, Cr, Cu-all see coments	X	--	Ammonia as nitrogen (MW-01, -04, -09, -14S)	601/602	EDB (MW-04) TPH (W-16)	Sampled 14 wells including Wells MW-01S, -01D, -03, -04, -04A, -06B, -06D, -07, -09, -11, -14S, -15S, -15D, -16. Additional analysis as part of Phase II RFI; unfiltered metals on MW-04S and -14S. Pb and Ni on wells 1, 4, 14S, 15S, 16; Fe, Zn on well 16.
7/92	pH	Cd, Cr, Cu	X	--	--	601/602	--	Sampled 14 wells. Performed annual statistical analysis.
10/92	pH	Cd, Cr, Cu	X	--	--	601/602	--	Sampled 14 wells.
1/93, 4/93	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells.
7/93	pH	Cd, Cr, Cu	X	--	--	8010/8020 (TVPH, TEPH)	--	Sampled 15 wells. (MW-13S was added) TVPH and TEPH analysis on MW-09, 13S, and 16 only. Performed annual statistical analysis.

TABLE 2-1  
PHIBRO-TECH, INC.  
Groundwater Monitoring Program Summary  
(continued)

10/93	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 15 wells (MW-13S not analyzed for metals and pH)  TVPH & TEPH analysis on MW-04, 07, 09, 13S, and 16 only.  Performed statistical analysis.
1/94, 4/94	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
7/94	pH	Cd, Cr, Cu	X	See comment	--	8010/8020	--	Sampled 14 wells, chloride and sulfate analyses on MW-04, MW-09, MW-14S, MW-15S, MW-15D, and MW-16. Performed statistical analysis
10/94, 1/95, 4/95, 7/95, 10/95	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
1/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis. 1995 Annual Report included as Appendix F.
4/96, 7/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
10/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis. 1996 Annual Report included as Appendix F.
1/97	pH	Cd, Cr, Cu	X	--	--	8260, MTBE	--	Sampled 14 wells Performed statistical analysis.

TABLE 2-1  
PHIBRO-TECH, INC.  
Groundwater Monitoring Program Summary  
(continued)

4/97, 7/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.
10/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. 1997 Annual Report included as Appendix F.
1/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. Hexavalent Chromium by Method 7196 in all wells; and by Method 218.6 in wells MW-4A, MW-14S, MW-15S, and MW-15D.
4/98, 7/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.
10/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. 1998 Annual Report included as Appendix F.
1/99, 4/99, 7/99, 10/99, 1/00	pH	Cd,Cr,Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.

Appendix III Parameters - Water Quality Parameters - Indicator Parameters (IP) - 624 - 601/602 - 8010/8020 - 8260 - MTBE - Appendix IX Parameters -	As, Ba, Cd, Cr, F, Pb, Hg, N, Se, Ag, Endrin, Lindane, Methoxychlor, Toxaphene, 2,4-D, 2,4,5-TP (Silvex), Radium, Gross Alpha & Beta, Turbidity, coliform bacteria. Cl, Fe, Mn, Phenols, Na, SO <sub>4</sub> TOX, TOC, pH, EC (quadruplicate) Volatile organics analysis Purgeable halocarbons/aromatics analysis Purgeable halocarbons/aromatic analysis Purgeable halocarbons/aromatic analysis Methyl tertiary butyl ether See Appendix F in the October 1990 Quarterly Sampling Report for a complete listing of parameters.
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## Section 3

# Laboratory Testing

Analytical and duplicate testing of groundwater samples collected during the January 2000 monitoring event was provided by Quanterra Laboratories of Santa Ana, California. During the January 2000 quarterly sampling event, a total of 23 water samples were submitted for laboratory analysis. Fourteen monitoring well samples and two blind duplicate samples from MW-04 and MW-09 were collected and submitted to Quanterra for analysis of purgeable halocarbons/aromatics (EPA Method 8260), cadmium, total and hexavalent chromium, copper, and pH. In addition, two equipment blank samples (EB) and one DI water sample were submitted for analysis of the above parameters. Four travel blanks (TB) were also submitted to Quanterra for analysis of purgeable halogenated/aromatic organics.

The January 2000 groundwater analytical results are discussed in Section 6 and summarized in Tables 6-1 through 6-4. Quality assurance analytical results (duplicates, equipment blanks, and travel blanks) are discussed in Section 4.0 and summarized in Tables 4-1 through 4-4. Individual analytical reports for January 2000 are contained in Appendix B.

## Section 4

# Quality Assurance

To verify the accuracy and validity of analytical data, certain quality assurance procedures were implemented. The field and laboratory quality assurance results were checked for deviations from the Quality Assurance (QA) guidelines discussed in the RFI Work Plan.

### 4.1 Field Quality Assurance

The field QA procedures included the use of duplicate samples, equipment blanks, travel blanks, and the use of chain-of-custody forms. The results of the QA analyses have been compiled by type of parameter: purgeable halogenated organics, purgeable aromatic organics, and inorganics, in Tables 4-1 through 4-3, respectively. Table 4-4 lists quality assurance results which are outside the ranges specified in the RFI Work Plan. Detection limits of parameters analyzed are shown in the analytical reports contained in Appendix B.

#### 4.1.1 Duplicate Samples

Standard accepted practice is to submit one duplicate sample for analysis for approximately every tenth sample collected, a ratio of 1 to 10. During the January 2000 round of sampling, duplicate samples were collected from monitoring wells MW-04 and MW-09. The duplicate samples were submitted to the analytical laboratory as blind samples, and were designated MW-35 and MW-37, respectively, on the chain of custody forms. Monitoring wells MW-04 and MW-09 were selected due to elevated concentrations of certain contaminants detected during previous sampling rounds. Analytical results for the duplicate samples for January 2000 are shown in Tables 4-1, 4-2, and 4-3.

Duplicate results which deviate greater than 20% from the original results are shown in Table 4-4. While the duplicate VOC results for MW-09 deviated by greater than 20%, the concentrations were not significantly different from the original sample (the duplicate concentrations were within the same order of magnitude as the original sample concentrations). Laboratory instrument reporting was consistent between the two samples as indicated by the surrogate recoveries in each sample.

#### 4.1.2 Equipment Blanks

Analytical results for the equipment blanks collected during January 2000 are shown in Tables 4-1, 4-2 and 4-3.

Equipment blank EB-01 was obtained by allowing deionized water to run through a new, precleaned, disposable bailer. The other equipment blank (EB-02) was obtained by pouring deionized water over the submersible pump after decontamination. The samples were collected in the appropriate containers and submitted for laboratory analysis. Sample EB-01 was collected to evaluate the effectiveness of the factory

cleaning process. Sample EB-02 was collected following pump decontamination after sampling well MW-16. The equipment blanks were submitted to the laboratory for analysis of purgeable halogenated/aromatic volatile compounds (EPA Method 8260), cadmium, chromium (total and hexavalent), copper, and pH. The analytical results did not indicate any detections above the method detection limits in either equipment blank.

### **4.1.3 Travel Blanks**

The detection of compounds in travel blanks is generally indicative of systematic contamination from sample transport, laboratory glassware cleaning, laboratory storage, or analytical procedures. During the January 2000 sampling event, four laboratory-prepared travel blanks (TB01 through TB04) consisting of organic-free water were labeled and submitted to the laboratory for purgeable halocarbon and aromatic volatile organic analysis by EPA Method 8260. Each travel blank was stored with the day's samples, to be analyzed for volatile organic compounds.

Tables 4-1 and 4-2 show the results of the travel blank analyses. No compounds were detected above the method detection limit in any of the four travel blanks.

### **4.1.4 Deionized Water Blank**

A sample of the deionized water (DI) used for decontamination purposes was submitted to the laboratory for analysis of purgeable halogenated/aromatic volatile compounds (EPA Method 8260), cadmium, chromium (total and hexavalent), copper, and pH. The analytical results did not indicate any detections above the method detection limits in the DI blank (Tables 4-1 and 4-2).

### **4.1.5 Sample Control**

All sample containers were labeled immediately prior to sampling with the sample identification information completed with a waterproof pen. Samples were transported under chain-of-custody and hand delivered by courier to the laboratory in ice-cooled chests. Copies of the chain-of-custody records are included in Appendix C.

## **4.2 Laboratory Quality Assurance**

General QA procedures for Quanterra Laboratory, which performed laboratory analysis on all monitor well and quality assurance samples, are discussed in the RFI report. Quanterra provides internal laboratory QA/QC results with each sample analytical report. Matrix spike, matrix spike duplicate, method blank, and duplicate control sample results are noted in the QA/QC reports. In addition, surrogate recoveries are also noted for volatile organics analyses. The laboratory QA/QC results were within acceptable limits for the January 2000 sampling. The laboratory control sample results were also within acceptable limits.

TABLE 4-1  
 PHIBRO-TECH, INC.  
 January 2000 Quarterly Monitoring Well Sampling  
 Quality Assurance Samples  
 Purgeable Halogenated Organic Analytical Results  
 (ug/L)

Sample Identification	Tetrachloro-ethene (PCE)	Trichloro-ethene (TCE)	1,1-Dichloro-ethene (1,1-DCE)	1,1-Dichloro-ethane (1,1-DCA)	1,2-Dichloro-ethane (1,2-DCA)	Chloroform (CHCL3)	trans-1,2-Dichloro-ethene (trans-1,2-DCE)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	Methylene chloride (CH2CL2)
PTI-DI	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-MW04	8.8	160	85	160	18	18	4.9	170	100
PTI-MW04-DUP	8.7	160	84	160	18	18	4.7	170	100
PTI-MW09	ND<5.0	170	52	170	38	150	ND<5.0	7.0	300
PTI-MW09-DUP	ND<5.0	120	36	130	31	110	ND<5.0	ND<5.0	270
PTI-TB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB03	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB04	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected

MW = Monitoring Well

DI = Deionized Water Blank collected from new shipment used for decontamination purposes.

MW-DUP = Monitoring Well - Duplicate

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TABLE 4-2  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring Well Sampling  
Quality Assurance Samples  
Purgeable Aromatic Organic Analytical Results  
(µg/L)

Sample Identification	Benzene	Toluene	Ethyl-benzene	Xylenes (Total)
PTI-DI	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-MW04	<b>5.1</b>	ND < 2.5	ND < 2.5	<b>6.0</b>
PTI-MW04-DUP	<b>5.0</b>	ND < 2.5	ND < 2.5	<b>6.0</b>
PTI-MW09	ND<5.0	ND<5.0	ND<5.0	ND<5.0
PTI-MW09-DUP	ND<5.0	ND<5.0	ND<5.0	ND<5.0
PTI-TB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB03	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB04	ND <1.0	ND <1.0	ND <1.0	ND <1.0

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected.

NA = Parameter not analyzed.

MW = Monitoring Well

DI = Deionized Water Blank collected from new shipment used for decontamination purposes.

MW-DUP = Monitoring Well - Duplicate

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TB = Travel Blank

TABLE 4-3  
 PHIBRO-TECH, INC.  
 January 2000 Quarterly Monitoring Well Sampling  
 Quality Assurance Samples  
 Inorganic Analytical Results  
 (mg/L)

Well Identification	Cadmium EPA- 6010B	Chromium (Hexavalent) EPA- 7196A	Chromium (Total) EPA-6010B	Copper EPA-6010B	pH EPA-150.1
PTI-DI	ND <0.0050	ND <0.020	ND <0.010	ND < 0.025	<b>5.8</b>
PTI-EB01	ND <0.0050	ND <0.020	ND <0.010	ND < 0.025	<b>6.5</b>
PTI-EB02	ND <0.0050	ND <0.020	ND <0.010	ND < 0.025	<b>5.3</b>
PTI-MW04	<b>0.32</b>	<b>76.3</b>	<b>60.0</b>	ND < 0.050	<b>6.7</b>
PTI-MW04-DUP	<b>0.32</b>	<b>69.9</b>	<b>58.5</b>	ND < 0.050	<b>6.8</b>
PTI-MW09	ND <0.0050	<b>14.1</b>	<b>13.9</b>	ND < 0.025	<b>7.0</b>
PTI-MW09-DUP	ND <0.0050	<b>13.5</b>	<b>13.2</b>	ND < 0.025	<b>6.9</b>

ND = Analytical parameter not detected.

NA = Parameter not analyzed.

MW = Monitoring Well

DI = Deionized Water Blank collected from new shipment used for decontamination purposes.

MW-DUP = Monitoring Well - Duplicate

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TABLE 4-4  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring Well Sampling  
Quality Assurance Deviations

Quality Assurance Criteria	Cadmium (µg/L)	Chromium, Hexavalent (µg/L)	Chromium, Total (µg/L)	Copper (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- benzene (µg/L)	Xylenes, Total (µg/L)	Halogenated Volatile Organic Compounds (µg/L)				
									Trichloro- ethene	1,1- Dichloro- ethene	1,1- Dichloro- ethane	Chloroform	cis-1,2- Dichloro- ethene
DI Blank PTI-DI- 045													
Equipment Blanks													
PTI-EB01- 045													
PTI-EB02- 045													
Travel Blanks													
PTI-TB01- 045													
PTI-TB02- 045													
PTI-TB03- 045													
PTI-TB04- 045													
Laboratory Blanks													
Method Blank													
Duplicate Deviation (>20%)													
PTI-MW04- 045													
PTI-MW09- 045									29.4%	30.8%	23.5%	26.7%	28.6%
Holding Time Exceedance													

DI = Deionized Water Blank collected from new shipment used for decontamination purposes.

EB01 = Equipment Blank collected from a new disposable bailer.

EB02 = Equipment Blank collected from the submersible pump.

TB = Travel Blank

## Section 5

# Groundwater Elevation

On January 25, 2000, prior to the initiation of well evacuation procedures, the depth to groundwater was measured in 22 of the 24 on-site monitoring wells. Groundwater elevations were calculated by subtracting the depth to static water level from the surveyed elevation of the corresponding monitoring well.

All of the monitoring well casing elevations were surveyed during the RFI and three wells (MW-04, MW-09, and MW-10) were resurveyed in January 1996 following wellhead repair. In July 1998, wellhead repairs were performed on wells MW-03, MW-06A, MW-06B, MW-06D, MW-08, MW-11, MW-12S, MW-12D, MW-13S, MW-13D, and MW-16. These wells were resurveyed during the July 1998 monitoring event.

During the January 2000 groundwater sampling round, water level measurements were taken at shallow wells MW-01S, MW-03, MW-04, MW-05, MW-06B, MW-07, MW-08, MW-09, MW-10, MW-11, MW-12S, MW-13S, MW-14S, MW-15S, and MW-16. Water level measurements were also taken at deep wells MW-01D, MW-04A, MW-06D, MW-12D, MW-13D, MW-14D, and MW-15D. These wells were measured in order to evaluate the direction and gradient of groundwater flow underlying the facility and to help characterize the shallow and deep aquifer interaction. Well MW-02 was not measured due to its proximity to MW-12S. Well MW-06A was measured and found to be dry.

Table 5-1 lists the depths to water and groundwater elevations for each well sampled. Figure 5-1 shows the approximate groundwater surface elevation of the upper Hollydale Aquifer for wells screened in the shallow interval (45 to 77 feet below ground surface) using data collected during the January 2000 sampling round. The contours shown in Figures 5-1 and 5-2 were generated by D.C.A., a surface contouring software developed by Softdisk, which is commonly used in conjunction with CADD (Computer Aided Drafting and Design) to produce contour maps and other graphics.

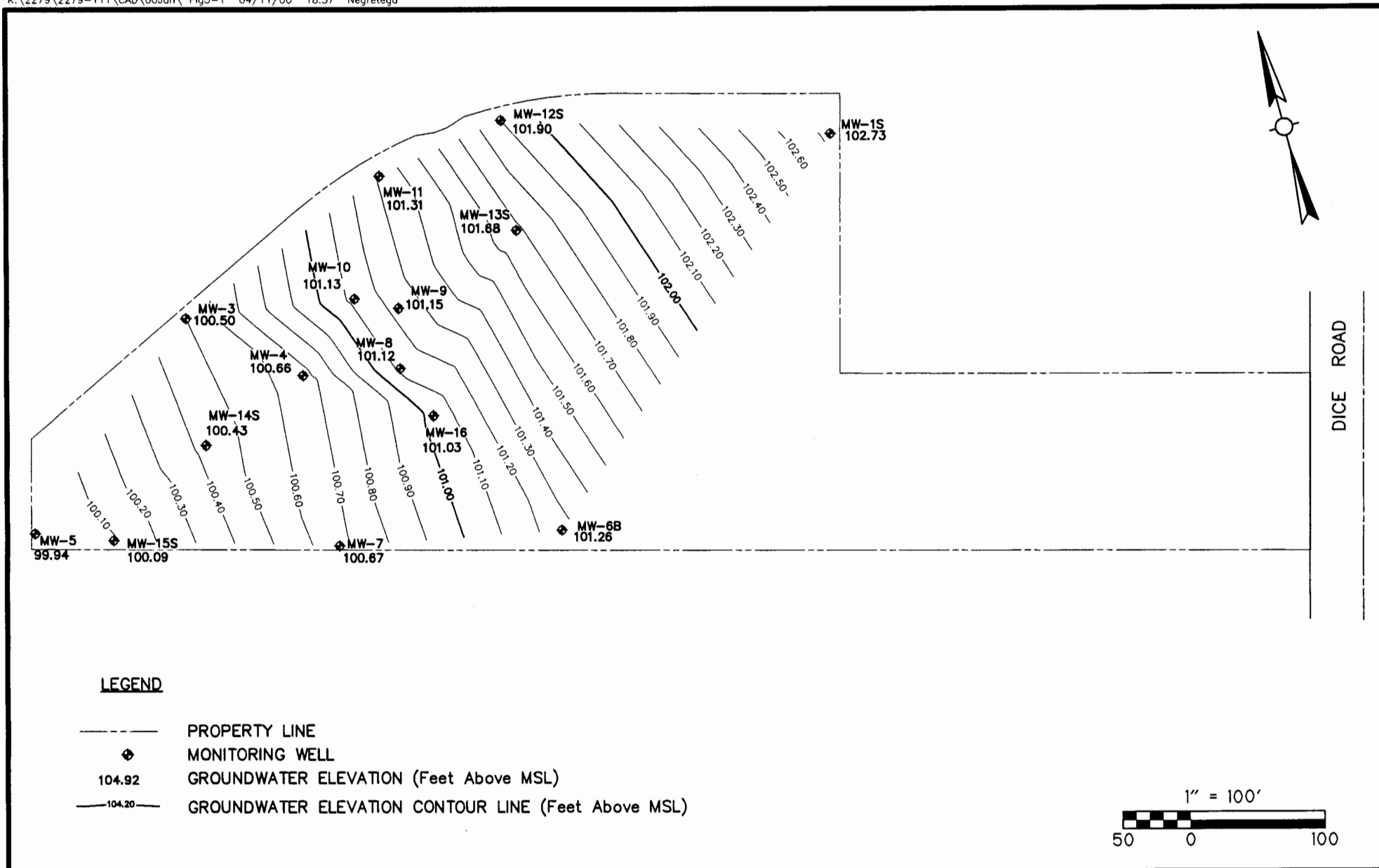
The direction of groundwater flow as observed in the shallow monitoring wells is approximately S 78° W at an average gradient of 0.45 feet per 100 feet in the western portion of the facility, where the majority of the monitoring wells are located. The gradient in the shallow wells is comparable to the October 1999 gradient of 0.33 feet per 100 feet. The flow direction is comparable to that obtained in October 1999 (S 76° W).

Figure 5-2 shows the approximate groundwater elevation of the lower Hollydale Aquifer for wells screened in the deeper interval (78.3 to 123.5 feet below ground surface). Groundwater contours for the deeper wells follow the same general trend as those of the shallow wells. The direction of groundwater flow is approximately S75°W at an average gradient of 0.43 feet per 100 feet. The gradient in the deep wells

is comparable to the October 1999 gradient of 0.42 feet per 100 feet, and to the flow direction obtained in October 1999 (S 78°W).

With the 22 wells measured for water levels during the January 2000 sampling round, there were seven locations where a deep well was measured adjacent to a shallow well. Shallow wells are screened within the interval of 45 to 77 feet. Deep wells are screened within the interval of 78.3 to 107 feet, with the exception of MW-15D which is screened from 108.5 to 123.5 feet. Of the well pairs, groundwater elevations at deep wells MW-1D, MW-4A, MW-6D, and MW-14D were slightly higher (0.03 feet to 0.16 feet) than the corresponding shallow well elevations. The groundwater elevations at deep wells MW-12D, MW-13D, and MW-15D were slightly lower (0.02 feet to 0.11 feet) than the corresponding shallow well elevations. Based on these and past groundwater elevation comparisons among shallow and deep well pairs, it does not appear that a well-defined vertical gradient between shallow and deep intervals exists.

Average groundwater elevations during the January 2000 sampling event decreased from the previous quarter. Water levels decreased by an average of 3.80 feet and ranged from a minimum of 3.61 feet at well MW-12D to a maximum of 4.01 feet at well MW-5.

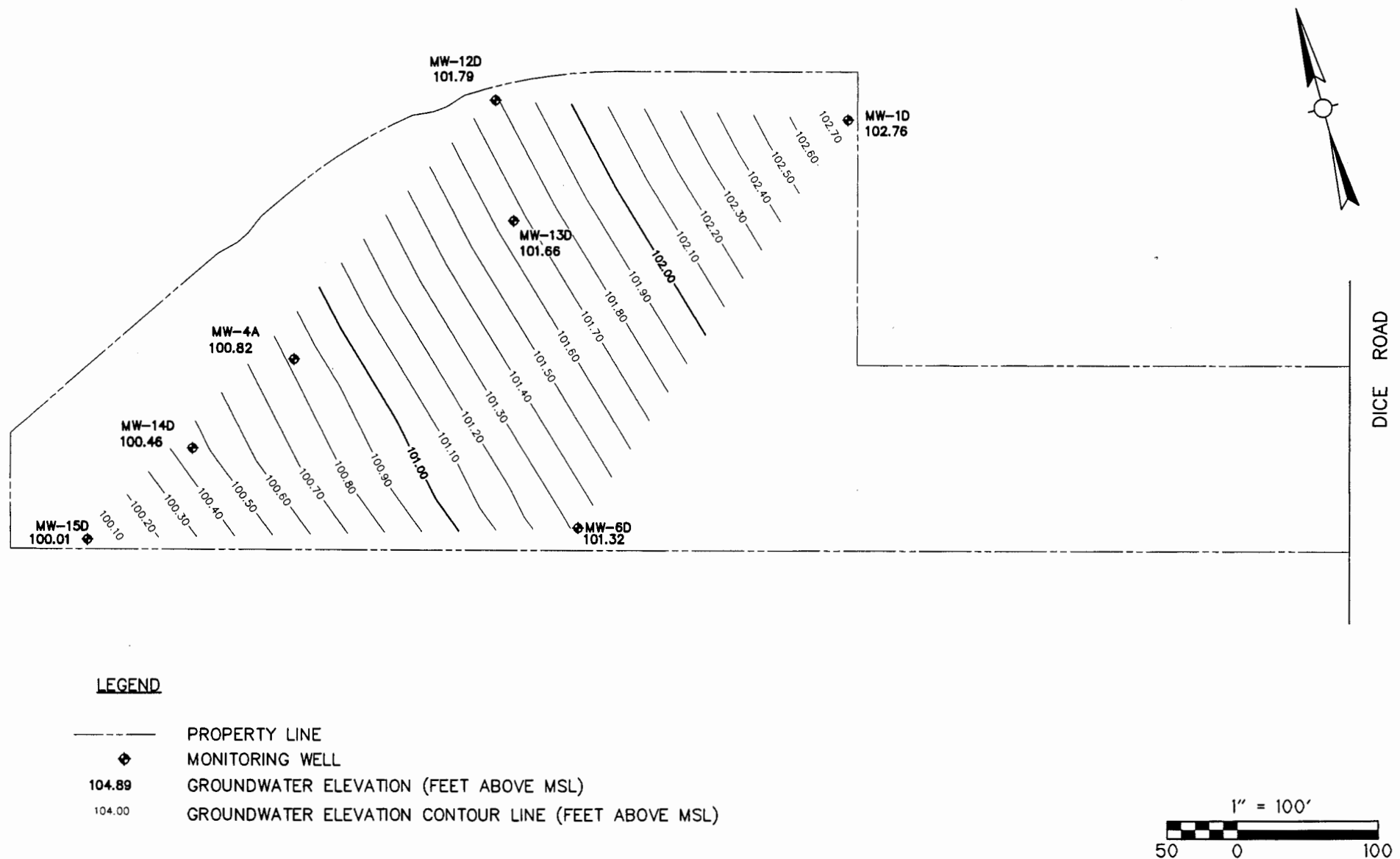


PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

# Groundwater Elevation Contours - Shallow Wells January 2000

**CDM**

environmental engineers, scientists,  
planners, & management consultants



PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

## Groundwater Elevation Contours - Deep Wells January 2000

**CDM**

environmental engineers, scientists,  
planners, & management consultants

TABLE 5-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring Well Sampling  
Groundwater Elevation Data

Well No.	Well Headspace* (ppm)	Total Depth Constructed (ft)	Total Depth Measured (ft)	Perforated Intervals (ft)	Calculated Casing Fill (ft)	M.P. Elevation (ft)	Depth to Water (ft below MP)	G.W. Elevation (ft above MSL)
1S	1.4 / 0.0	62.5	62.5	47-62.5	0.0	152.63	49.90	102.73
1D	2.0 / 0.0	94.8	94.8	79.5-94.5	0.0	152.60	49.84	102.76
3	12.0 / 0.0	74.1	73.7	45-75	0.4	154.75	54.25	100.50
4	1.0 / 0.0	67.5	67.5	45-75	0.0	152.37	51.71	100.66
4A	0.0 / 0.0	107.0	107.0	87-107	0.0	152.46	51.64	100.82
5	0.0 / 0.0	75.0	---	45-75	---	153.26	53.32	99.94
6A	183.0 / 0.0	---	---	10-30	---	---	DRY	---
6B	39.0 / 0.0	77.6	77.3	45-75	0.3	149.53	48.27	101.26
6D	0.0 / 0.0	95.5	90.7	79-94	2.1	150.13	48.81	101.32
7	7.0 / 0.0	71.5	71.5	45-75	0.0	149.42	48.75	100.67
8	28.0 / 0.0	71.0	---	41-71	---	150.17	49.05	101.12
9	29.0 / 0.0	73.5	73.5	44-77	0.0	152.96	51.81	101.15
10	2.0 / 0.0	75.0	---	45-75	---	153.89	52.76	101.13
11	0.0 / 0.0	75.5	74.4	55-75	1.1	155.76	54.45	101.31
12S	69 / 0.0	72.0	---	51-72	---	155.79	53.89	101.90
12D	0.0 / 0.0	101.0	---	84.5-100	---	155.72	53.93	101.79
13S	7.0 / 0.0	70.3	---	50.3-70.3	---	151.72	50.04	101.68
13D	0.0 / 0.0	93.3	---	78.3-93.3	---	151.68	50.02	101.66
14S	71.0 / 0.0	71.5	71.0	46-72	0.5	150.50	50.07	100.43
14D	0.0 / 0.0	109.0	---	88-103	---	150.56	50.10	100.46
15S	4.0 / 0.0	71.5	71.5	51.5-71.5	0.0	151.01	50.92	100.09
15D	0.0 / 0.0	123.8	124.3	108.5-123.5	0.0	150.96	50.95	100.01
16	9.0 / 0.0	62.5	62.4	42-62	0.1	150.27	49.24	101.03

M.P. = Measuring point (top of steel casing)

G.W. = Groundwater

--- = Not measured or not calculated.

MSL = mean sea level

\* = Measured with PID prior to sampling (casing/background)

Note: Depth to water measurements collected on January 25, 2000 prior to purging/sampling on-site wells.

## Section 6

# Groundwater Quality

In order to compare the analytical data from the previous sampling events (1989 through October 1999 quarterly events) with the January 2000 data, Table 6-1 was compiled. This table compares groundwater analytical parameters (hexavalent and total chromium, cadmium, copper, purgeable aromatics and trichloroethene), and groundwater elevations at shallow well locations which were sampled during January 2000. Laboratory analytical reports from all wells sampled during the January 2000 sampling round are located in Appendix B.

Consistent with the results of laboratory testing performed on the groundwater samples collected since January 1989 from the on-site monitoring wells, three contaminant plumes in the Hollydale Aquifer were identified. Historically, these plumes have been present at varying concentrations and lateral extent. One small plume, consisting primarily of site-specific metals parameters, has been aligned in a northeasterly to southwesterly direction in the vicinity of wells MW-04 and MW-14S. The second, consisting of purgeable aromatics, has also been aligned in a northeasterly to southwesterly direction with the highest concentrations generally found in wells MW-04 and MW-09. The third plume consists of trichloroethene and related parameters with highest concentrations generally detected in wells MW-04, MW-09, MW-11, and MW-14S.

### 6.1 Purgeable Halogenated Organic Compounds

Table 6-2 shows the analytical results for purgeable halogenated organic compounds in deep and shallow wells during January 2000. Trichloroethene was the primary compound detected, with miscellaneous other halogenated organics also detected. The table also shows, for comparison purposes, maximum contaminant limits (MCLs) and concentrations for water supply wells in the Santa Fe Springs area. The supply wells, however, are likely screened much deeper than the wells at PTI. The City of Santa Fe Springs Annual Water Quality Report for 1998 (the most recent report available) is contained in Appendix D of this document.

#### Trichloroethene

Trichloroethene (TCE) was detected in all 14 of the groundwater monitoring wells sampled during January 2000. The highest concentration of TCE detected in January 2000 was 820 µg/L in well MW-11, an increase from 650 µg/L in October 1999. The second highest concentration of TCE detected was 230 µg/L in well MW-14S, an increase from the result of 180 µg/L in October 1999. The third highest concentration of TCE detected was 170 µg/L in wells MW-03 and MW-09, which decreased in MW-9 from 280 µg/L and remained the same in MW-03 when compared to the October 1999 results.

Detected concentrations of TCE in the majority of the remaining shallow wells increased slightly in January 2000 from the results in October 1999, and ranged in

concentration from 9.9 in MW-01S to 160 µg/L in MW-04. Deep well detections decreased in all four wells (MW-01D, MW-06D, MW-04A, and MW-15D). TCE concentrations in the deep wells ranged from 4.2 µg/L in MW-04A to 9.7 in well MW-15D.

Concentrations for TCE detected in shallow and deep wells are shown on Figures 6-1 and 6-2, respectively.

A review of the analytical results contained in Table 6-1 reveals that, with minor exceptions, TCE has historically been detected in all on-site monitoring wells, including the upgradient wells. Past discussions with Department of Health Services (now Cal EPA Department of Toxic Substances Control) and Regional Water Quality Control Board staff indicate that TCE is generally recognized as a regional groundwater contaminant.

### **Other Halogenated Organics**

During the January 2000 sampling, other purgeable halocarbon compounds were detected in most of the on-site wells at concentrations ranging from 1.1 µg/L for chloroform (MW-07) to 300 µg/L for methylene chloride (MW-09). The compounds tetrachloroethene; 1,1-dichloroethene; 1,1-dichloroethane; 1,2-dichloroethane; carbon tetrachloride; and cis- and trans-1,2-dichloroethene were also detected in several wells. Detections of these other chlorinated organic compounds are assumed to be related to the TCE plume.

## **6.2 Purgeable Aromatic Organic Compounds**

According to PTI personnel, organic chemicals have not historically been used on-site in any of the production processes. Two 10,000 gallon underground storage tanks (diesel and gasoline), however, were located in the approximate center of the facility, due east of the drum wash area. During tank removal operations in July 1989, petroleum hydrocarbon contamination was discovered in the tank excavation. The RFI report indicated that petroleum hydrocarbon contamination was not detected at depths below 30 feet near the former tank locations. Although they have not been used on-site, purgeable aromatic compounds have been historically detected in groundwater underlying the facility. The primary organic compounds of concern are toluene, ethylbenzene and total xylenes, which vary in both concentration and lateral extent. The RFI report indicated that these compounds appeared to be migrating onto the subject property from the property to the north. According to Los Angeles County Department of Public Works files, leaks from tanks containing purgeable aromatic compounds with subsequent groundwater contamination are known to have occurred at the property to the north of PTI.

Purgeable aromatic compound results for January 2000 are presented in Table 6-3. Concentrations of total aromatic compounds for the shallow wells are illustrated on Figure 6-3. Historic sampling results indicate that purgeable aromatic contamination originated off-site to the north and has migrated onto the subject property. During

previous sampling events, elevated concentrations of toluene, ethylbenzene and xylenes were detected in MW-11 and MW-3 along the northern perimeter of the property. Since approximately July 1991, elevated concentrations of these compounds have been detected in well MW-04, indicating that migrating down gradient. In addition, high concentrations have also been detected in well MW-09 beginning in January 1992. However, for the last four sampling events no purgeable aromatic compounds were detected in MW-09. High concentrations of ethylbenzene were detected in MW-14S in February 1995, April 1998, and July 1999.

The results of the January 2000 sampling show that the highest concentrations of total purgeable aromatics (BTEX) were detected in MW-03 (Figure 6-3), which had an ethylbenzene concentration of 54 µg/L, a total xylenes concentration of 70 µg/L, and a total BTEX concentration of 124 µg/L. The second highest total BTEX concentration was detected in well MW-04, which had a benzene concentration of 5.1 µg/L and total BTEX of 11.1 µg/L.

### **Benzene**

Benzene was detected in one well, MW-04 at a concentration of 5.1 µg/L. In October 1999, benzene was not detected in any of the wells at concentrations above the detection limit. Historical evidence indicates that benzene is not a contaminant of concern for the facility.

### **Toluene**

As in July and October 1999, toluene was not detected in any of the wells during the January 2000 event.

Significant toluene concentrations were detected during July 1990 to July 1991 (MW-1), July 1991 to January 1992 (MW-04), July 1992 to July 1993 (MW-09), and July 1994 to January 1995 (MW-09). Concentrations were also detected at location MW-04 during January 1993. Elevated ethylbenzene and total xylene concentrations are generally associated with elevated toluene concentrations.

### **Ethylbenzene**

During the January 2000 sampling round, ethylbenzene was detected in fewer wells and at generally lower concentrations than in October 1999. Well MW-03 had the highest concentration (54 µg/L), a decrease from 200 µg/L reported in October 1999. Well MW-15S had the second highest concentration (9.3 µg/L), a decrease from 12 µg/L detected in October 1999. Wells MW-06B and MW-06D had concentrations of 2.0 µg/L and 1.8 µg/L, respectively.

### **Total Xylenes**

During the January 2000 sampling round, total xylenes were detected in 2 wells. Well MW-03 had a concentration of 70 µg/L, an increase from a nondetect result in October

1999. Well MW-04 had a total xylenes concentration of 6.0 µg/L, a decrease from 11 µg/L in October 1999.

### 6.3 Inorganic and Miscellaneous Parameters

Table 6-4 shows the analytical results for inorganic parameters (cadmium, total and hexavalent chromium, copper, and pH) during the January 2000 sampling event.

#### Hexavalent Chromium (Cr+6)

During the January 2000 sampling, hexavalent chromium was detected in three wells. Well MW-04 had a concentration of 76.3 mg/L, which is an increase from 58.2 mg/L in October 1999. Hexavalent chromium concentrations were also detected in wells MW-09 (14.1 mg/L) and MW-14S (0.11 mg/L) at increased concentrations when compared to October 1999. Figure 6-4 shows the concentration of hexavalent chromium detected in the shallow wells during the January 2000 sampling.

The water purged from MW-04 has typically been bright yellow in color since CDM began sampling the wells on a quarterly basis in January 1989. During the July 1999 sampling round, the color of water from MW-04 was again noted as yellow. The color of the water from MW-09 has periodically been noted as yellow. During the January 2000 event, the water from MW-09 was noted as yellow, however, during October 1999 the water from this well was clear. Figure 6-5 shows the concentrations of hexavalent chromium and groundwater elevations in MW-04 over time.

The concentrations of hexavalent chromium at MW-04 decreased from July 1989 (120 mg/L) to July 1993 (1.8 mg/L), while groundwater elevations increased. During the approximate period from 1993 through 1999, hexavalent chromium concentrations fluctuated up and down while groundwater elevations remained fairly constant. Historically, hexavalent chromium has been detected in wells MW-04, MW-14S, MW-09, MW-15S, and MW-11; although the highest concentrations have always been detected at MW-04. Hexavalent chromium in MW-09 has ranged from nondetect to 2.28 mg/L between 1989 and 1991; this compound was nondetect between 1991 and 1998 in MW-09. Detectable concentrations of hexavalent chromium have been detected in MW-09 since 1998 with the highest concentration detected in February 2000. Hexavalent chromium has generally not been detected in well MW-11 with the exception of January 1992 and October 1999. Detectable concentrations of hexavalent chromium have only been detected in well MW-15S in three sampling events between 1995 and 2000. Well MW-14S contained detectable concentrations between 1990 and 1993; hexavalent chromium in MW-14S have fluctuated between nondetect and 0.11 mg/L since 1993.

#### Total Chromium (Cr[T])

Total chromium was detected above the detection limit in four monitoring wells during the January 2000 sampling event. The highest concentration was detected in well MW-04 at a concentration of 60 mg/L, which is a decrease from 105 mg/L which

was detected in October 1999. The remaining wells with total chromium detections had concentrations ranging from 0.015 mg/L in MW-04A to 13.9 mg/L in MW-09. Figure 6-6 shows the concentrations of total chromium detected in shallow monitoring wells during January 2000. Figure 6-7 shows the concentrations of total chromium and corresponding groundwater elevations in MW-04 over time.

Comparison of historical total chromium data with present data (Table 6-1) indicates that total chromium concentrations, like those of hexavalent chromium, generally decreased from January 1989 to July 1993, and have fluctuated up and down since July 1993. Historically, the highest total chromium concentrations have been detected in MW-04. Sporadic detections of total chromium close to the detection limit have occurred historically in nearly all shallow wells on site.

### **Cadmium (Cd)**

During the January 2000 sampling event, cadmium was detected in three wells. Cadmium concentrations ranged from 0.0094 mg/L in MW-14S to 0.32 mg/L in MW-4. The concentrations were lower in wells MW-04 and MW-14S than those concentrations reported in October 1999. Cadmium was detected in well MW-15S for the first time since January 1993.

Previous concentrations in MW-04 have ranged from 0.028 mg/L in January 1989 to 0.86 mg/L in July 1992. Figure 6-8 shows the cadmium concentrations detected in the on-site wells during January 2000. Figure 6-9 shows the concentrations in MW-04 of cadmium and corresponding groundwater elevations in MW-04 over time. As shown on the figure, cadmium concentrations have fluctuated considerably (i.e., from non-detectable at a detection limit of 0.005 mg/L during July 1993 to 0.86 mg/L during July 1992) since July 1990.

Cadmium has been detected consistently only in well MW-04. Historically, cadmium has been detected at concentrations of 0.01 mg/L in MW-01 during July 1989, 0.005 to 0.018 mg/L in MW-14S during October 1990 through July 1991, 0.0055 mg/L in MW-14S during July 1995, and in MW-15S at low concentrations close to the detection limit from July 1991 to January 1993. Detected concentrations in MW-15S ranged from 0.005 mg/L in July 1992 to 0.02 mg/L during October 1991.

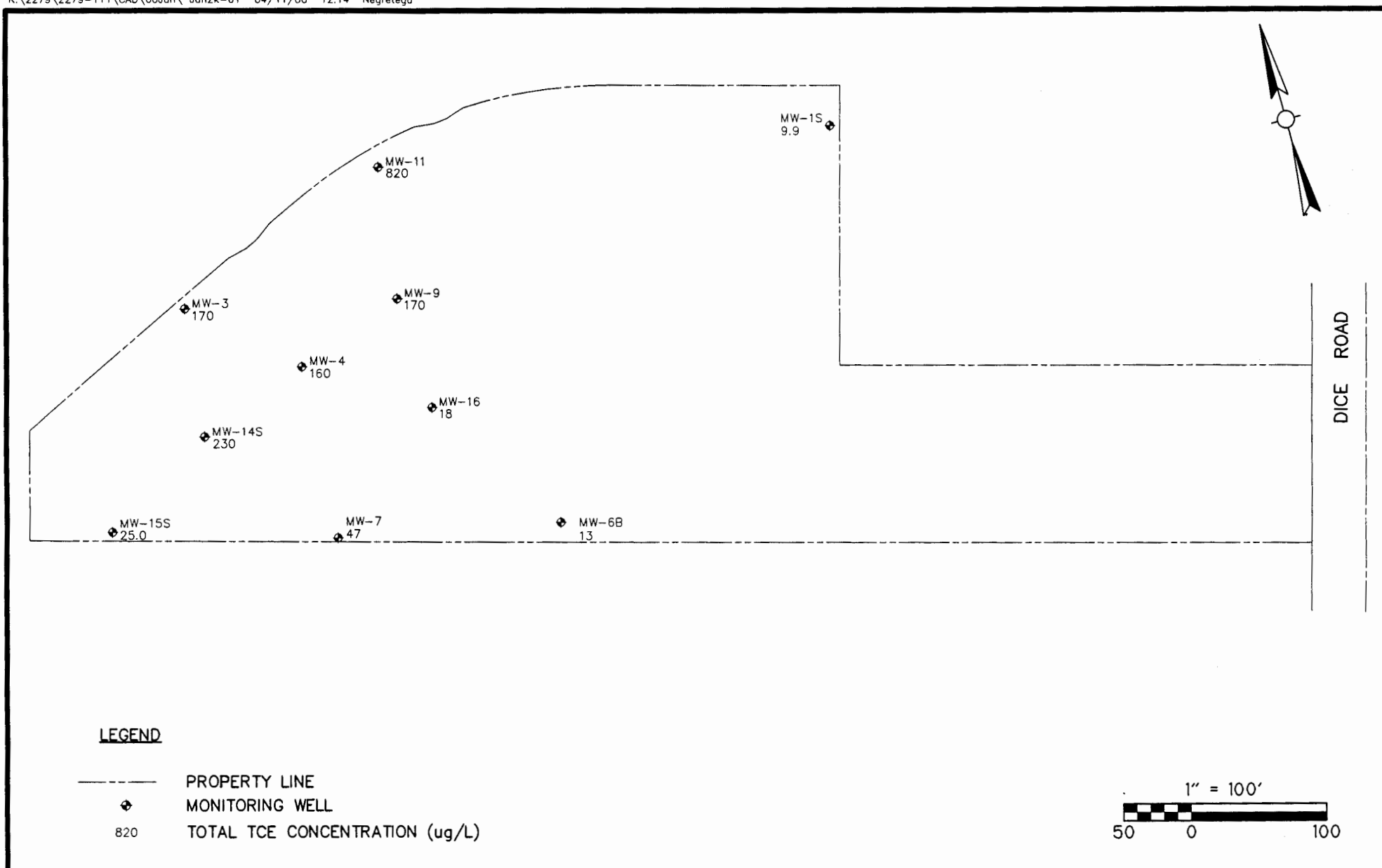
### **Copper (Cu)**

Copper was detected in one well, MW-14S, at a concentration of 0.031 mg/L. Figure 6-10 shows the copper concentrations detected in the on-site wells during January 2000. Historically, with the exception of well MW-14S, elevated concentrations of copper above the MCL have not been detected in on-site monitoring wells.

### **pH**

Groundwater samples from all wells were measured for pH in the field during purging activities and also by the analytical laboratory on the samples submitted for

analysis. Field pH measurements were recorded in the field log book during well purging. In January 2000, the field measurements of pH generally correlated with the values shown in Table 6-4, which range from 6.7 to 8.4.



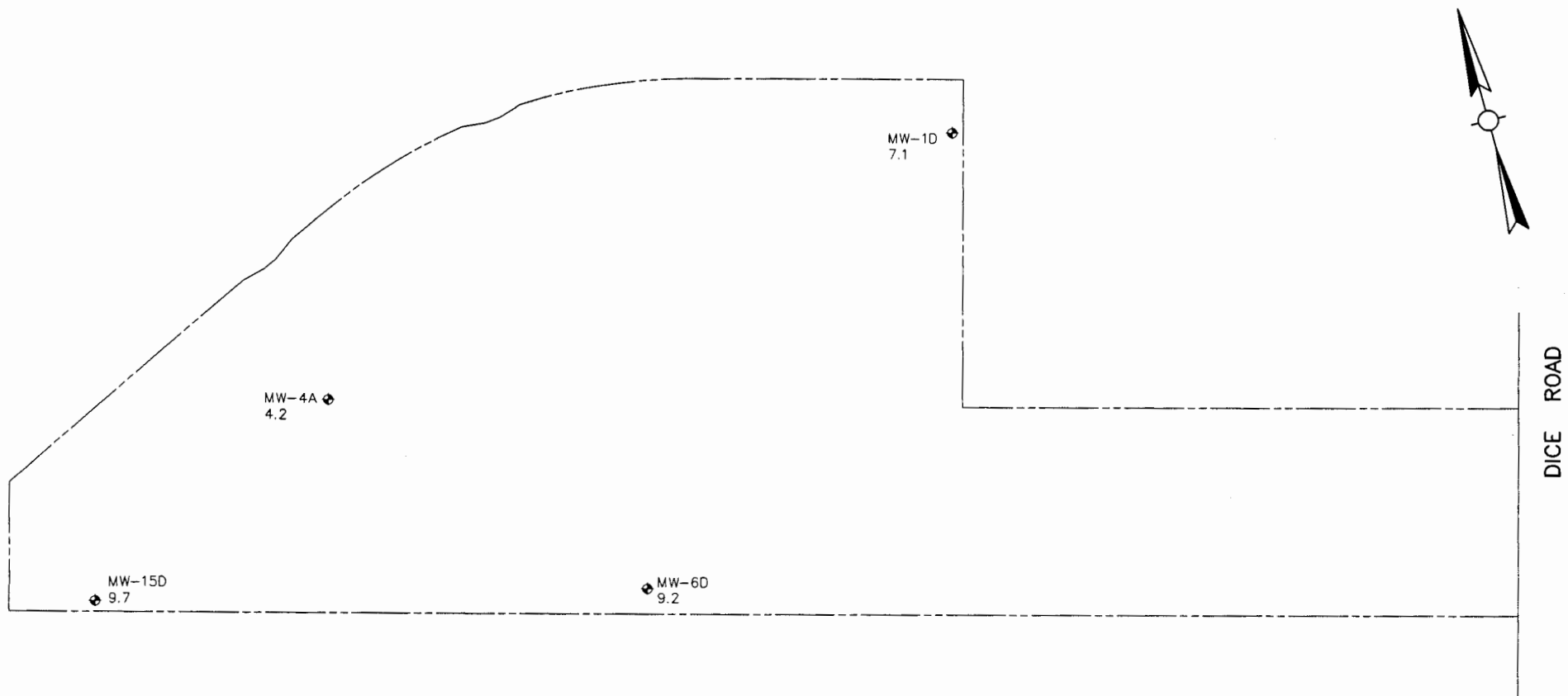
PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

# **TCE Concentrations - Shallow Wells** **January 2000**

**CDM**

environmental engineers, scientists,  
 planners, & management consultants

Figure 6-1



**LEGEND**

- PROPERTY LINE
- ⬢ MONITORING WELL
- 9.7 TCE CONCENTRATION (ug/L)

1" = 100'

50 0 100

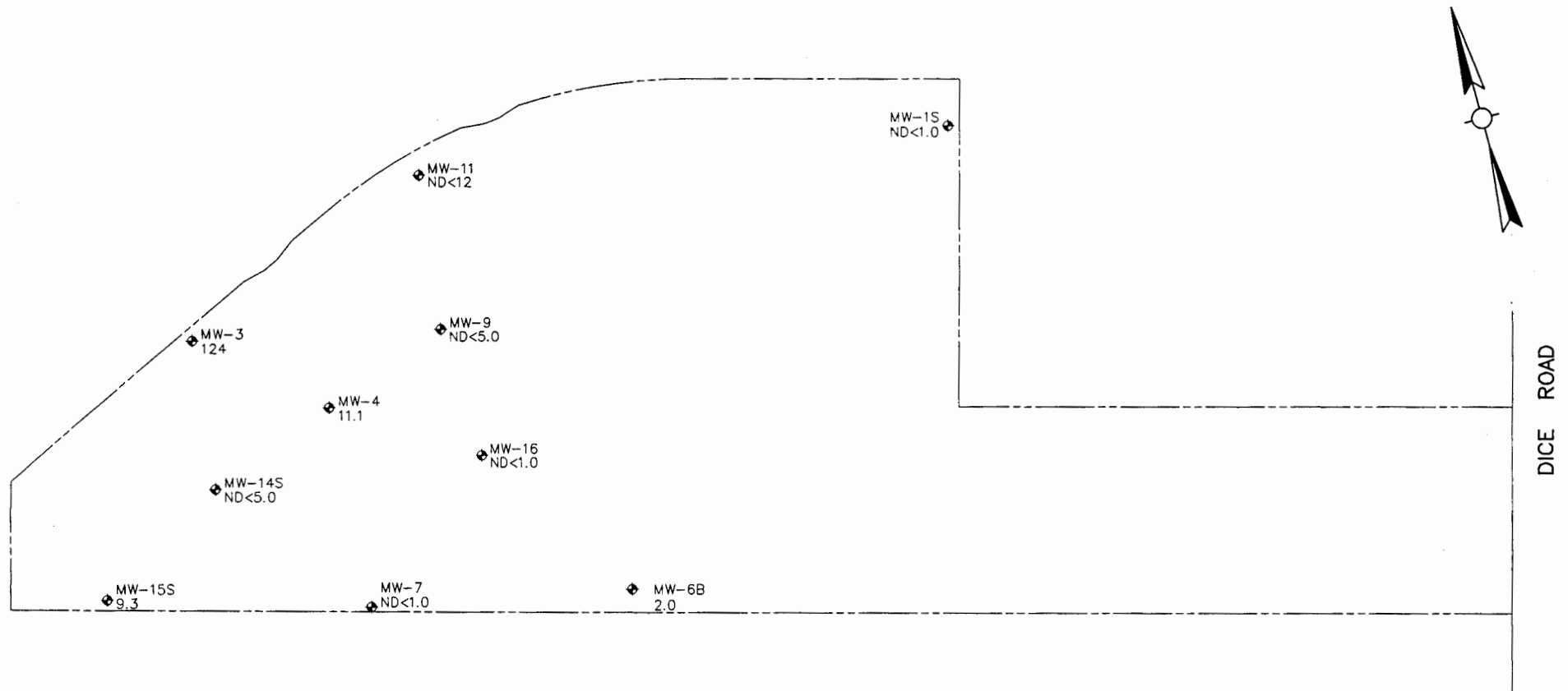
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**TCE Concentrations - Deep Wells**  
**January 2000**

**CDM**

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Figure 6-2



DICE ROAD

# LEGEND

- PROPERTY LINE
- ◆ MONITORING WELL
- 124 TOTAL BTEX CONCENTRATION (ug/L)
- ND NOT DETECTED

1" = 100'

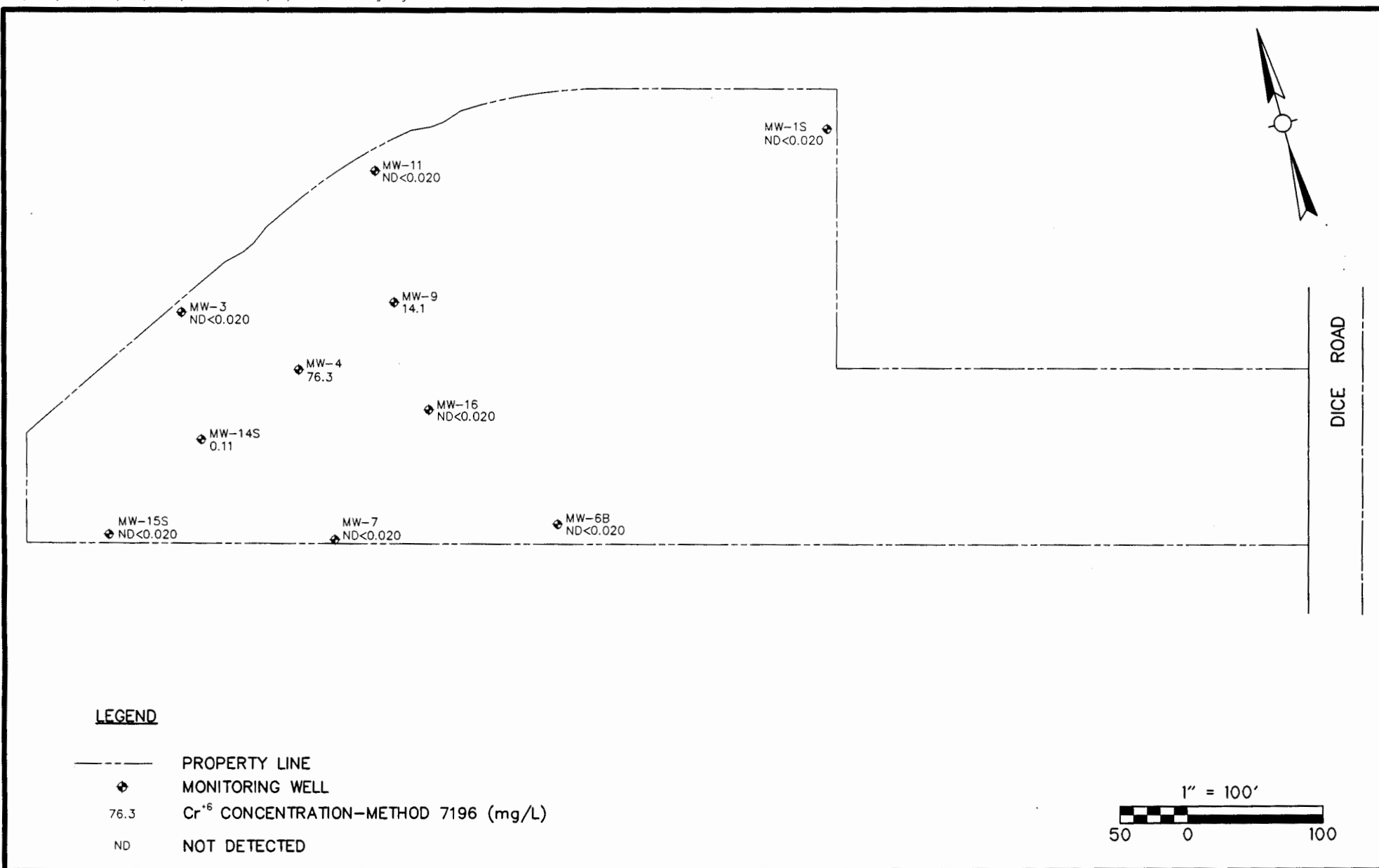
50 0 100

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## Total BTEX Concentrations - Shallow Wells January 2000

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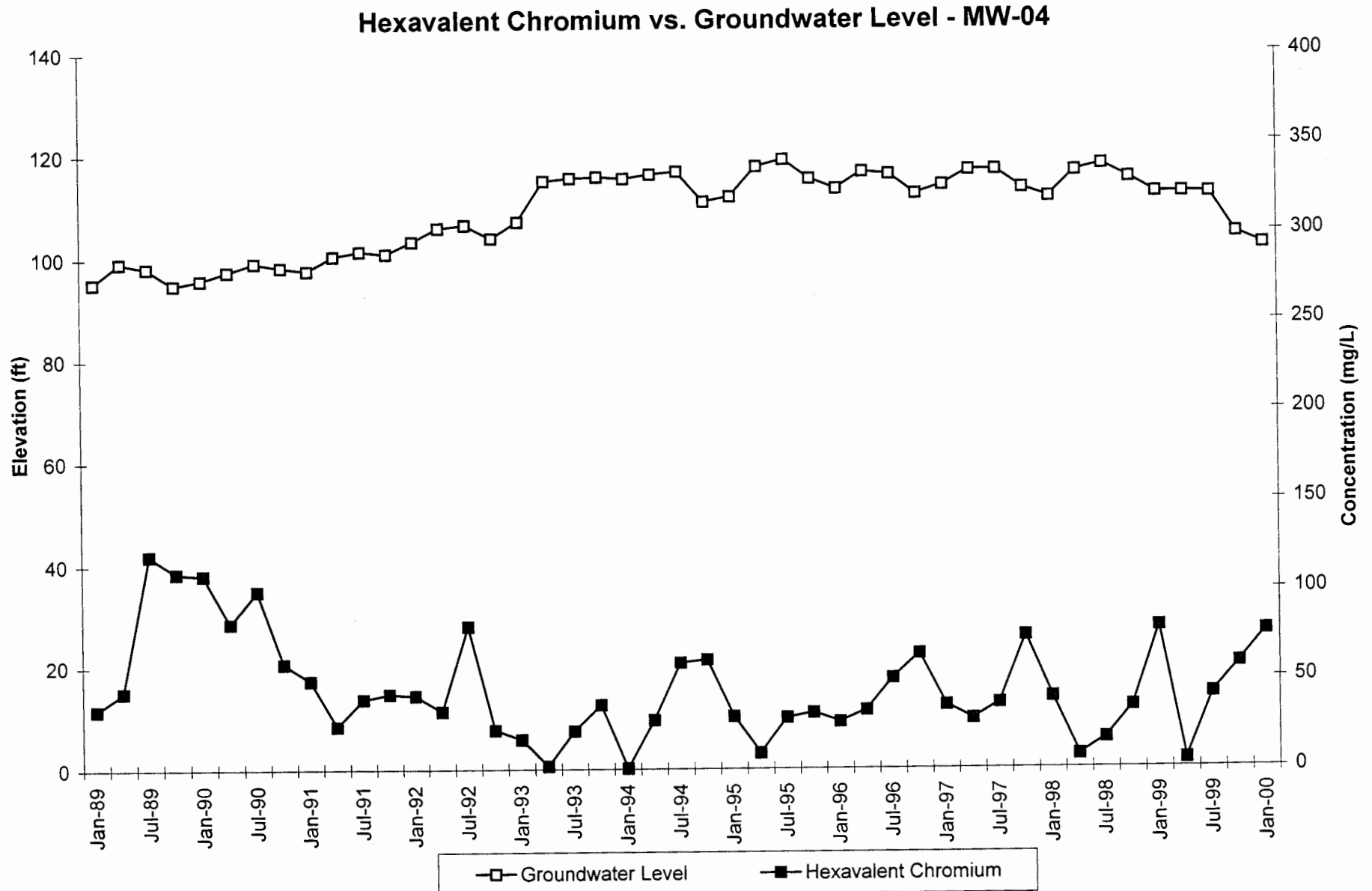


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## Hexavalent Chromium Concentrations - Shallow Wells January 2000

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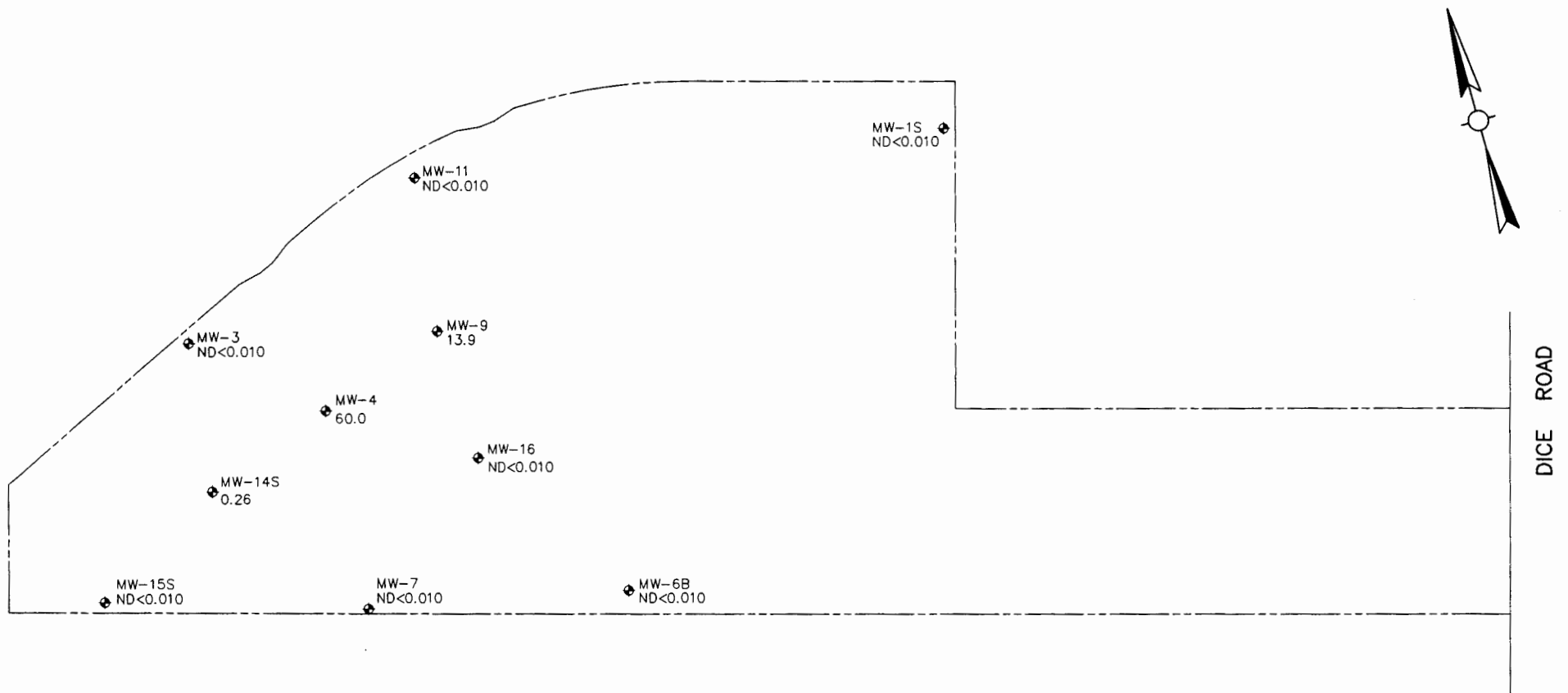


PHIBRO-TECH, INC., SANTA FE SPRINGS, CA.

**Hexavalent Chromium Concentrations - Groundwater Elevations**  
**MW-04**  
**January 1989 - January 2000**

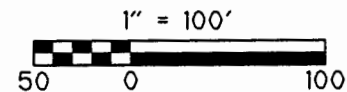
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# LEGEND

---	PROPERTY LINE
+	MONITORING WELL
60.0	TOTAL CHROMIUM CONCENTRATION (mg/L)
ND	NOT DETECTED



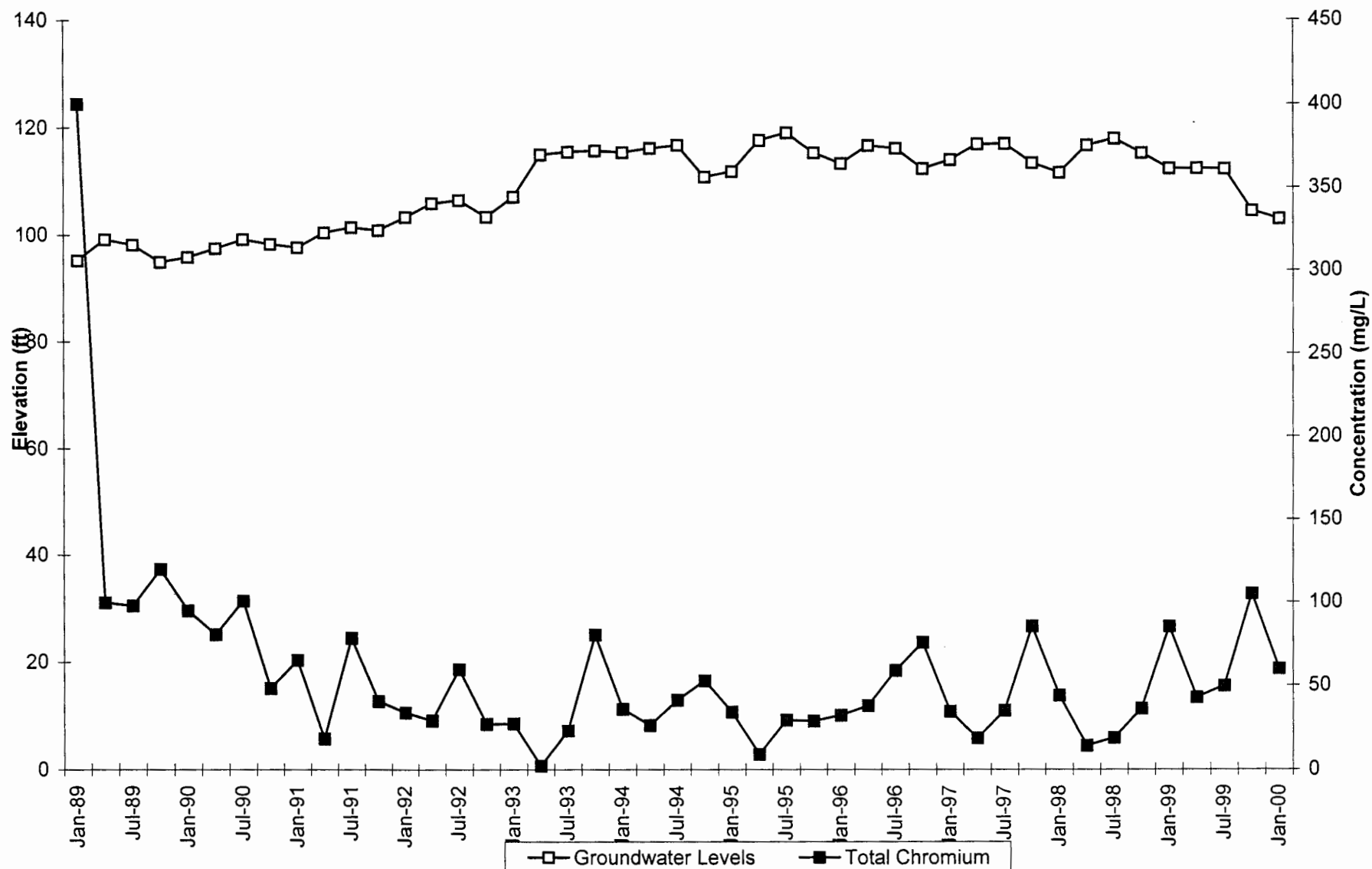
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## Total Chromium Concentrations - Shallow Wells January 2000

**CDM**

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# Total Chromium vs. Groundwater Level - MW04

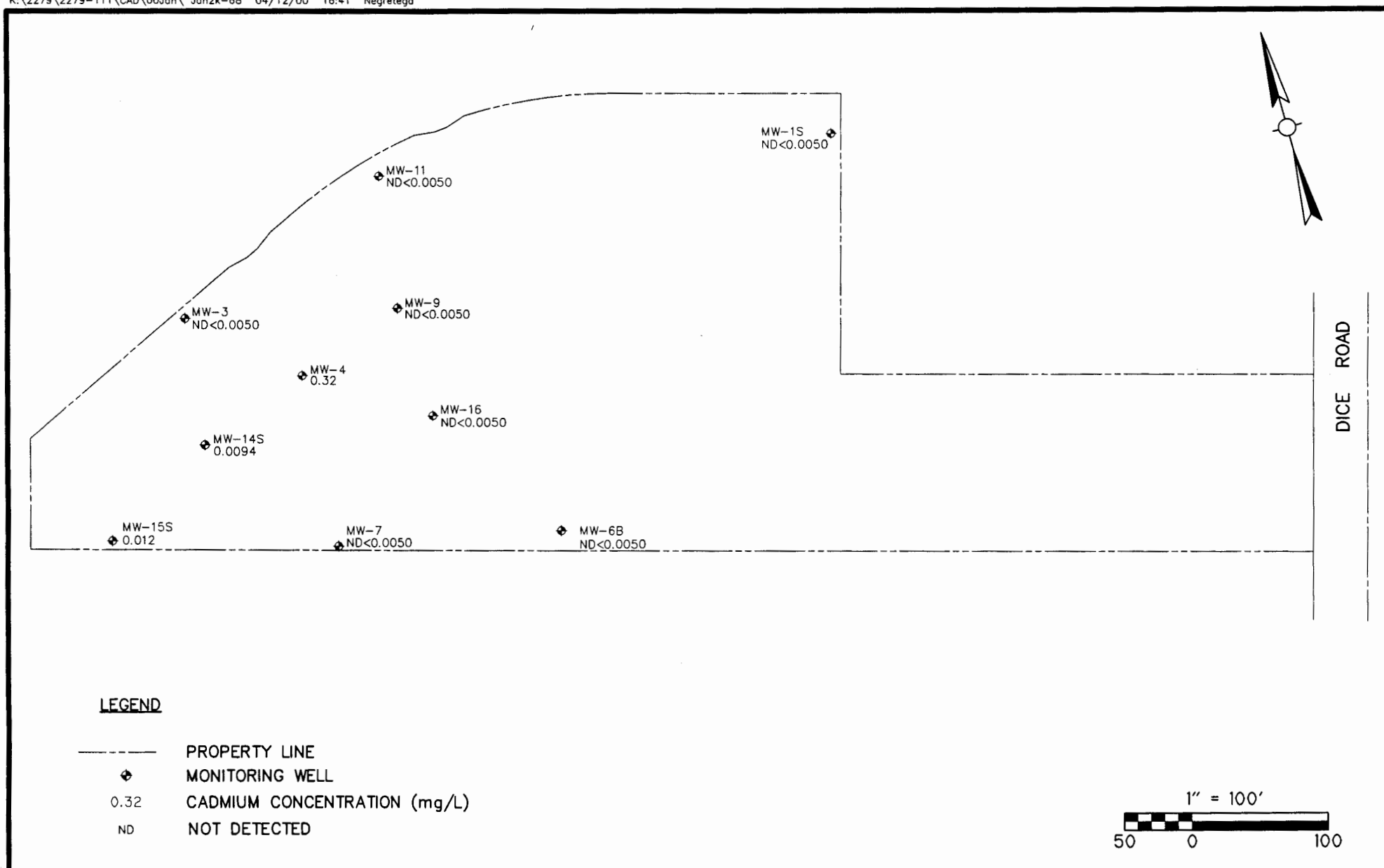


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**Total Chromium Concentrations - Groundwater Elevations**  
**MW-04**  
**January 1989 - January 2000**

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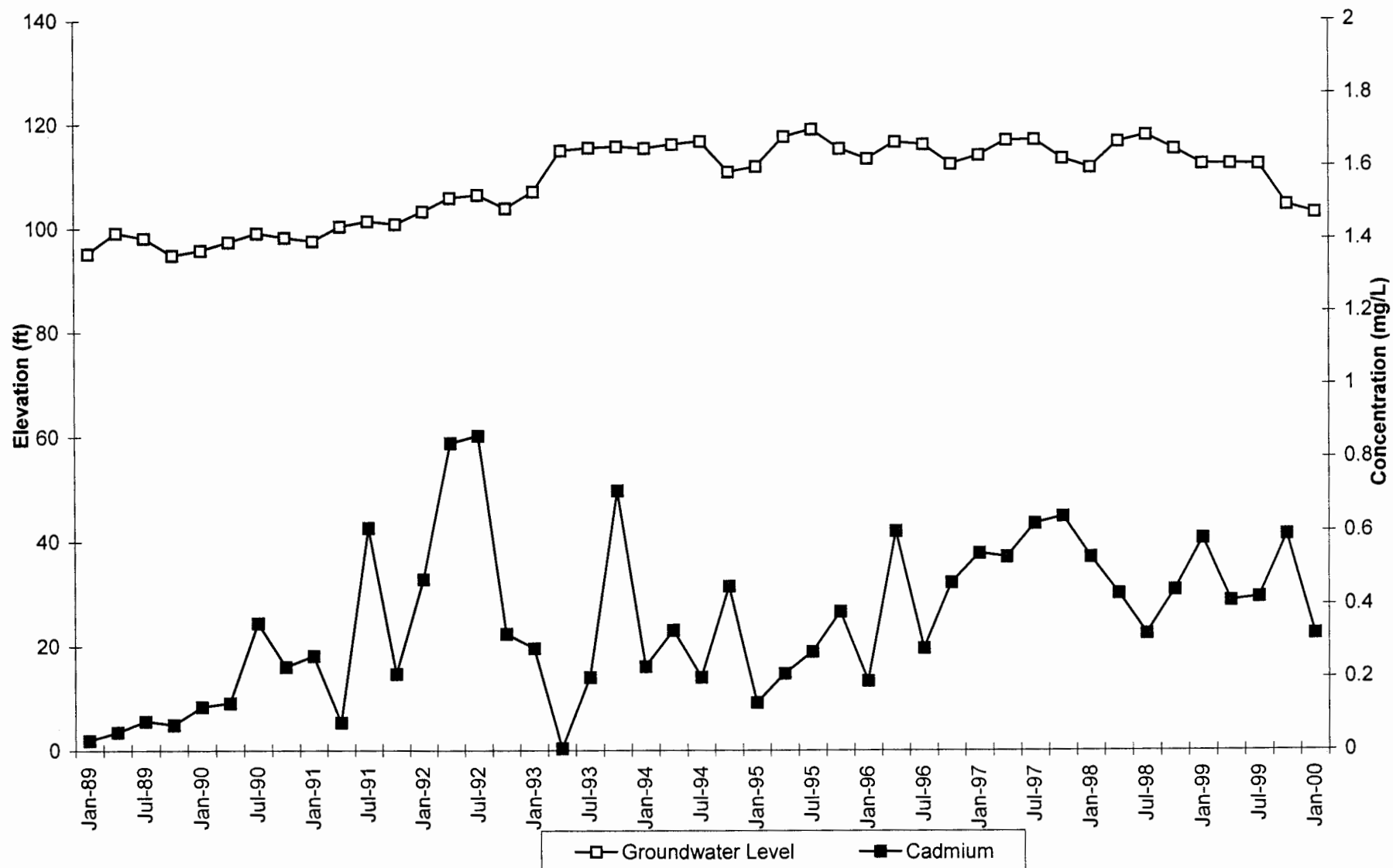
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### Cadmium Concentrations - Shallow Wells January 2000

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### Cadmium vs. Groundwater Level - MW04

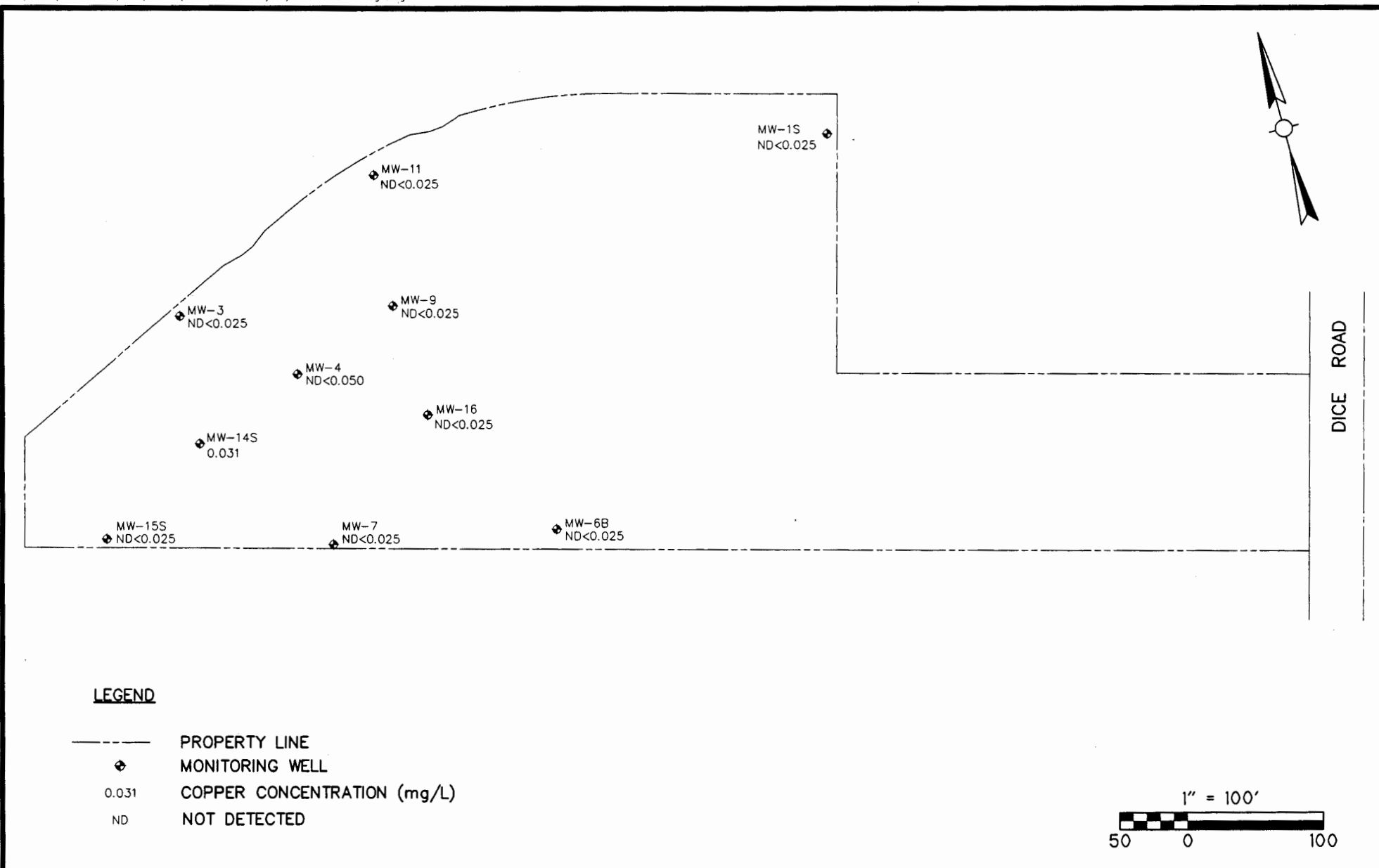


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**Cadmium Concentrations - Groundwater Elevations**  
**MW-04**  
**January 1989 - January 2000**

**CDM**

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 planners, & management consultants



PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

### Copper Concentrations - Shallow Wells January 2000

**CDM**

environmental engineers, scientists,  
planners, & management consultants

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 1S										
Jan-89	96.74	ND < 0.01	0.014	ND < 0.003	ND < 0.009	ND < 0.01	ND < 0.0	ND < 0.0	ND < 0.0	19
Apr-89	100.45	ND < 0.05	0.1	ND < 0.01	ND < 0.02	ND < 0.7	ND < 1.0	ND < 1.0	3.0	23
Jul-89	99.00	ND < 0.05	0.06	0.01	0.03	ND < 0.7	ND < 1.0	ND < 1.0	ND < 1.0	13
Oct-89	96.76	ND < 0.05	ND < 0.02	ND < 0.01	ND < 0.05	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jan-90	97.73	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 0.5	ND < 0.5	ND < 0.5	ND < 1.0	16
Apr-90	99.30	ND < 0.02	0.02	ND < 0.0050	0.02	ND < 2.5	ND < 2.5	ND < 2.5	ND < 5.0	20
Jul-90	100.83	ND < 0.02	ND < 0.01	ND < 0.01	0.03	ND < 0.5	ND < 0.5	ND < 0.5	ND < 1.0	18
Oct-90	99.81	ND < 0.02	ND < 0.01	ND < 0.0050	0.023	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	18
Jan-91	99.19	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	26
Apr-91	101.95	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	22
Jul-91	102.94	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	17
Oct-91	102.33	ND < 0.02	0.01	ND < 0.0050	0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jan-92	104.60	0.10	0.0081	ND < 0.0027	0.04	ND < 1	1.5	1.2	4.3	13
Apr-92	107.28	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5	9.9
Jul-92	107.87	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	10
Oct-92	105.53	ND < 0.02	ND < 0.01	ND < 0.0050	0.035	0.95	ND < 1.0	ND < 1.0	ND < 1.0	11
Jan-93	109.82	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	2.2	1.3	5.6	9.2
Apr-93	116.01	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.7
Jul-93	116.59	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	1.7	1.7	4.0	11
Oct-93	116.50	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.2	4.3	14
Jan-94	116.60	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	9.3
Apr-94	117.10	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jul-94	117.80	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	7.9
Oct-94	112.23	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	5.8	13
Jan-95	113.59	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.2
Apr-95	118.78	ND < 0.02	0.0029	ND < 0.01	ND < 0.02	ND < 0.5	ND < 1.0	1.3	1.0	4.4
Jul-95	120.06	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	1.2	3.5	6.1	6.2
Oct-95	116.48	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.7	3.9	15
Jan-96	114.84	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.7	5.1	8.4
Apr-96	118.03	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	3.4	4.9	2.9
Jul-96	117.42	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.2	3.7	9.7
Oct-96	113.85	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.1	2.8	16
Jan-97	115.73	ND < 0.02	ND < 0.01	ND < 0.0050	0.022	ND < 0.5	ND < 1.0	ND < 1.0	2.0	6.0
Apr-97	118.21	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.4	1.2	15
Jul-97	118.18	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Oct-97	114.82	ND < 0.02	ND < 0.01	ND < 0.0050	0.023	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jan-98	113.23	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Apr-98	118.16	ND < 0.02	ND < 0.01	ND < 0.0050	0.021	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jul-98	119.12	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Oct-98	116.57	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	7.8
Jan-99	113.94	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.0	ND < 1.0	10
Apr-99	114.01	ND < 0.025	ND < 0.01	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 2.0	7.2
Jul-99	113.62	ND < 0.020	ND < 0.010	ND < 0.0050	0.052	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	9.1
Oct-99	106.70	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 2.0	9.1
Jan-00	102.73	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	9.9

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 3										
Jan-89	95.02	ND < 0.01	0.014	0.003	ND < 0.009	7.4	17.0	4900.0	1500.0	74
Apr-89	99.29	ND < 0.5	0.07	ND < 0.01	ND < 0.02	ND < 50	ND < 50.0	1200.0	60.0	110
Jul-89	98.21	ND < 0.5	0.06	ND < 0.01	ND < 0.02	ND < 7	ND < 10.0	ND < 10.0	ND < 10.0	120
Oct-89	94.75	ND < 0.5	ND < 0.02	ND < 0.01	ND < 0.05	ND < 50	ND < 100.0	1600.0	150.0	ND < 100
Jan-90	95.98	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 5	ND < 5.0	110.0	ND < 10.0	65
Apr-90	97.72	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 50	ND < 50.0	2100.0	720.0	74
Jul-90	99.27	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 5	ND < 5.0	ND < 5.0	ND < 10.0	130
Oct-90	97.29	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	9	2.0	ND < 1.0	ND < 1.0	130
Jan-91	97.69	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	38
Apr-91	99.81	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	27
Jul-91	101.63	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	28
Oct-91	100.99	ND < 0.02	ND < 0.01	ND < 0.005	0.03	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	71
Jan-92	103.44	ND < 0.5	0.0081	ND < 0.0027	0.02	ND < 1	ND < 1.0	ND < 1.0	4.0	76
Apr-92	106.04	ND < 0.02	ND < 0.02	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 5.0	25
Jul-92	106.61	ND < 0.02	ND < 0.02	ND < 0.005	0.13	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	76
Oct-92	103.93	ND < 0.02	ND < 0.02	ND < 0.005	0.038	0.52	ND < 1.0	ND < 1.0	ND < 1.0	130
Jan-93	107.28	ND < 0.02	ND < 0.01	ND < 0.005	0.096	ND < 2.5	ND < 5.0	ND < 5.0	ND < 5.0	84
Apr-93	115.17	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jul-93	115.92	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	3.3	2.6	5.9	16
Oct-93	115.67	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.6	4.8	17
Jan-94	115.59	ND < 0.02/0.4**	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	10
Apr-94	116.33	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	15
Jul-94	116.91	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	26
Oct-94	110.85	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	1.2	3.5	1.5	12.0	76
Jan-95	111.83	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	72
Apr-95	117.83	ND < 0.02	0.0023	ND < 0.001	ND < 0.02	ND < 0.5	ND < 1.0	1.3	ND < 1.0	57
Jul-95	119.20	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	2.0	5.2	8.8	9.5
Oct-95	115.45	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	1.7	3.3	30
Jan-96	113.41	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	5.1	26
Apr-96	116.73	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.6	3.6	46
Jul-96	116.33	ND < 0.01	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	1.8	9.0	12.0	17
Oct-96	112.45	ND < 0.01	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	5.4	6.2	21
Jan-97	114.19	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	2.6	1.1	4.2	28
Apr-97	117.13	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	4.3	2.1	3.0	13
Jul-97	117.18	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.5	3.7	13
Oct-97	113.60	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	0.57	ND < 1.0	1.7	1.2	24
Jan-98	111.68	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	1.3	ND < 1.0	25
Apr-98	116.82	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	18
Jul-98	118.02	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	25
Oct-98	115.40	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	24
Jan-99	112.48	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.3	ND < 1.0	26
Apr-99	112.49	ND < 0.025	ND < 0.01	ND < 0.005	ND < 0.025	ND < 1.0	ND < 1.0	1.1	ND < 2.0	21
Jul-99	112.31	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	1.3	ND < 1.0	43
Oct-99	104.42	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 5.0	ND < 5.0	200	ND < 10	170
Jan-00	100.50	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 2.5	ND < 2.5	54	70	170

\*\* Hexavalent chromium sample or result for MW03 likely switched with MW30 (duplicate of MW04).

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation ( Feet MSL)	METALS				PURGEABLE					HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)	
MW - 4											
Jan-89	95.21	33.0	400.0	0.028	ND< 0.009	ND< 0.5	10.0	15.0	29.0	120	
Apr-89	99.19	43.0	100.0	0.05	0.02	ND< 5	23.0	15.0	50.0	280	
Jul-89	98.19	120.0	98.0	0.08	0.06	ND< 14	ND< 20.0	140.0	40.0	290	
Oct-89	94.92	110.0	120.0	0.07	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	250	
Jan-90	95.87	109.0	95.1	0.12	ND< 0.02	ND< 12	ND< 12.0	ND< 12.0	ND< 25.0	220	
Apr-90	97.50	81.7	80.7	0.13	0.02	ND< 10	ND< 10.0	ND< 10.0	ND< 20.0	280	
Jul-90	99.20	100.0	101.0	0.35	ND< 0.02	ND< 50	ND< 50.0	1600.0	170.0	320	
Oct-90	98.33	58.9	48.4	0.23	0.022	ND< 0.5	17.0	230.0	650.0	250	
Jan-91	97.68	49.4	65.3	0.26	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1200.0	180	
Apr-91	100.50	23.8	18.4	0.076	ND< 0.02	ND< 0.5	ND< 1.0	730.0	ND< 1.0	170	
Jul-91	101.47	39.1	78.5	0.61	ND< 0.02	ND< 0.5	16000.0	6700.0	18000	190	
Oct-91	100.91	42.0	40.8	0.21	ND< 0.01	ND< 0.5	6900.0	4100.0	10000	ND< 400	
Jan-92	103.33	41.0	34.0	0.47	0.045	ND< 250	18,000	10,000	17,200	ND< 250	
Apr-92	105.94	32.2	29.2	0.84	0.053	6.7	7.2	960.0	1010.0	280	
Jul-92	106.5	79.9	59.7	0.86	ND< 0.02	ND< 5	ND< 10.0	200.0	280.0	280	
Oct-92	103.92	21.6	27.1	0.32	ND< 0.02	71	ND< 10.0	1300.0	230.0	230	
Jan-93	107.13	16.4	27.4	0.28	ND< 0.02	ND< 130	10000.0	10000	19000	ND< 250	
Apr-93	115	1.8	2.2	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	88.0	13.0	25	
Jul-93	115.52	21.0	23.2	0.2	0.056	0.6	2.0	1.8	11.0	100	
Oct-93	115.76	* 35.5/99.2	80.3	0.71	ND< 0.2	1.3	ND< 1.0	ND< 1.0	40.0	290	
Jan-94	115.42	0.36	36.0	0.23	ND< 0.02	0.81	ND< 1.0	8.3	14.0	130	
Apr-94	116.20	26.9	26.4	0.33	ND< 0.02	ND< 0.5	ND< 1.0	4.0	6.5	190	
Jul-94	116.76	59.0	41.4	0.20	0.038	0.58	ND< 1.0	ND< 1.0	4.2	340	
Oct-94	110.86	60.7	52.8	0.45	ND< 0.02	ND< 5	ND< 10.0	270.0	39.0	390	
Jan-95	111.88	28.8	34.3	0.13	0.026	ND< 5	ND< 10.0	350.0	130.0	190	
Apr-95	117.69	8.6	9.1	0.21	0.052	ND< 100	1600.0	1700.0	2900.0	67	
Jul-95	119.05	* 28.1/20.8	29.6	0.27	*.10/ND< 0.2	ND< 10	* 270/410	* 260/380	* 890/1300	90	
Oct-95	115.35	**30.8	28.9	0.38	ND< 0.02	ND< 2.5	ND< 5.0	75.0	21.0	150	
Jan-96	113.37	25.7	32.4	0.19	ND< 0.02	ND< 50	100.0	2100.0	1400.0	160	
Apr-96	116.65	* 32.2/24.6	38.0	0.60	ND< 0.02	ND< 25	680.0	1300.0	1400.0	130	
Jul-96	116.17	50	58.9	0.28	ND< 0.02	ND< 50	ND< 100.0	1000.0	270.0	140	
Oct-96	112.38	63.8	75.7	0.46	ND< 0.04	ND< 50	380.0	1100.0	1900.0	310	
Jan-97	114.07	*45.9/34.9	34.5	0.54	0.02	ND< 6.2	ND< 12.0	1100.0	ND< 12.0	330	
Apr-97	116.96	27.3	18.8	0.53	ND< 0.02	ND< 12	35.0	1300.0	620.0	150	
Jul-97	117.04	36.0	35.2	0.62	ND< 0.02	ND< 5	ND< 10.0	810.0	110.0	150	
Oct-97	113.46	73.8	85.3	0.64	ND< 0.08	ND< 5	ND< 10.0	460.0	31.0	230	
Jan-98	111.66	39.2	44.0	0.53	ND< 0.02	ND< 5	ND< 10.0	530.0	420.0	180	
Apr-98	116.69	7.2	14.1	0.43	ND< 0.02	2.9	ND< 5.0	320.0	ND< 5.0	92	
Jul-98	117.95	16.3	18.9	0.32	ND< 0.02	ND< 12	ND< 25.0	1200.0	300.0	120	
Oct-98	115.31	34.1	36.2	0.44	0.030	ND< 6.2	ND< 12.0	740.0	240.0	120	
Jan-99	112.41	78.6	85.2	0.58	ND< 0.040	ND< 5.0	ND< 10	520.0	31.0	260	
Apr-99	112.43	*0.57/4.6	42.8	0.41	ND< 0.050	3.5	ND< 2.5	220	9.9	190	
Jul-99	112.33	41.1	49.7	0.42	ND < 0.050	ND < 10	ND < 10	670	67	140	
Oct-99	104.49	58.2	105	0.59	ND < 0.075	ND < 5.0	ND < 5.0	92	11	210	
Jan-00	100.66	76.3	60.0	0.32	ND < 0.050	5.1	ND < 2.5	ND < 2.5	6.0	160	

\* 35.5/99.2 = original sample/duplicate sample (both results presented because duplicate result deviation is >20%)

\*\* Analyzed after holding time had expired.

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation ( Feet MSL)	METALS				PURGEABLE				
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	HALOCARBONS Trichloroethene (ug/L)
MW - 6B										
Jan-89	95.12	ND< 0.01	ND< 0.014	ND< 0.003	ND< 0.009	ND< 0.01	ND< 0.0	ND< 0.0	ND< 0.0	57
Apr-89	99.11	ND< 0.05	0.06	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	37
Jul-89	98.39	ND< 0.05	0.04	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	29
Oct-89	95.35	ND< 0.05	ND< 0.02	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	29
Jan-90	96.1	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	46
Apr-90	97.76	ND< 0.02	0.02	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	61
Jul-90	99.28	ND< 0.02	0.02	ND< 0.01	ND< 0.02	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	51
Oct-90	98.45	ND< 0.02	0.012	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	52
Jan-91	97.87	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	59
Apr-92	105.86	ND< 0.02	0.014	ND< 0.005	ND< 0.02	ND< 0.5	ND< 0.5	1.1	0.8	19
Jul-92	106.57	ND< 0.02	0.019	ND< 0.005	0.054	ND< 0.5	ND< 0.5	ND< 1.0	ND< 1.0	10
Oct-92	104.12	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	12.0	2.9	13.0	9.3
Jan-93	107.23	ND< 0.02	0.011	ND< 0.005	0.038	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.9
Apr-93	114.64	ND< 0.02	0.014	ND< 0.005	ND< 0.02	ND< 0.5	64.0	26.0	88.0	2.6
Jul-93	115.34	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	2.2	2.0	5.5	2.7
Oct-93	115.46	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	5.9
Jan-94	115.37	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	2.7
Apr-94	116.15	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	2.0
Jul-94	116.67	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.1	ND< 1.0	1.9	2.9
Oct-94	111.13	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.5	ND< 1.0	8.2	1.5
Jan-95	112.19	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	110.0	89.0	110.0	8.6
Apr-95	117.42	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.6	9.1	6.2	2.3
Jul-95	118.93	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.1	4.0	5.1	8.8
Oct-95	115.45	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1.0	2.6
Jan-96	113.47	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	28.0	27.0	53.0	14
Apr-96	116.65	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 1	4.2	37.0	50.0	2.9
Jul-96	116.18	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.3	3.5	2.3
Oct-96	112.66	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.0	2.1	2.8	6.1
Jan-97	114.20	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	4.3	4.3	6.4	5.0
Apr-97	116.95	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	3.6	1.7	ND< 1.0	5.2
Jul-97	117.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.6
Oct-97	113.71	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.4
Jan-98	112.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	15.0	32.0	39.0	17.0
Apr-98	116.76	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.6	4.2	6.0	7.7
Jul-98	117.95	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	4.3
Oct-98	114.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	9.9
Jan-99	112.74	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	5.0	24.0	29.0	17.0
Apr-99	112.56	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 1.0	19	42	33.9	31
Jul-99	112.43	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	1.2	ND < 1.0	8.2
Oct-99	105.04	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	4.8	ND < 1.0	12.0
Jan-00	101.26	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	2.0	ND < 1.0	13.0

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor No. / Date	Groundwater Elevation ( Feet MSL)	METALS				PURGEABLE				Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 7										
Jan-89	89.47	ND< 0.01	ND< 0.014	ND< 0.003	ND< 0.009	ND< 0.5	1.4	1.2	3.6	35
Apr-89	98.83	ND< 0.05	0.02	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	47
Jul-89	97.90	ND< 0.05	0.03	ND< 0.01	ND< 0.05	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	25
Oct-89	94.72	ND< 0.05	ND< 0.02	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	44
Jan-90	95.58	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	39
Apr-90	97.32	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	46
Jul-90	98.85	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 1	ND< 1.0	ND< 1.0	ND< 2.0	34
Oct-90	98.02	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	19
Jan-91	97.41	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	1.8
Apr-91	100.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	30
Jul-91	101.20	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	53
Oct-91	100.62	ND< 0.02	ND< 0.01	ND< 0.005	0.01	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	54
Jan-92	102.90	0.07	ND< 0.008	ND< 0.003	0.14	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	120
Apr-92	105.54	ND< 0.02	0.013	ND< 0.005	0.032	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	55
Jul-92	103.13	ND< 0.02	0.095	ND< 0.005	0.21	ND< 1	ND< 2.0	ND< 2.0	ND< 2.0	53
Oct-92	103.68	ND< 0.02	0.063	ND< 0.005	0.65	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	98
Jan-93	106.82	ND< 0.02	0.033	ND< 0.005	0.19	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	73
Apr-93	114.54	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 1.2	ND< 2.5	90.0	5.6	23
Jul-93	115.14	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	210.0	ND< 10.0	43
Oct-93	115.23	ND< 0.2	ND< 0.01	ND< 0.005	0.02	0.82	ND< 1.0	7.2	ND< 1.0	44
Jan-94	115.08	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	1.4	ND< 1.0	33.0	ND< 1.0	53
Apr-94	115.88	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	200.0	ND< 5.0	96
Jul-94	116.44	ND< 0.02	ND< 0.01	ND< 0.005	0.023	0.88	ND< 1.0	7.7	1.2	140
Oct-94	110.69	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	5.1	5.5	98
Jan-95	111.59	ND< 0.02	ND< 0.01	ND< 0.005	0.026	ND< 0.5	7.0	8.7	10.0	170
Apr-95	117.24	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.3	ND< 1.0	26
Jul-95	118.63	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.1	3.4	53
Oct-95	115.08	ND< 0.02	0.014	ND< 0.005	0.079	0.74	ND< 1.0	3.8	1.4	98
Jan-96	112.98	ND< 0.02	ND< 0.01	ND< 0.005	0.043	1.0	4.2	4.9	10.0	85
Apr-96	116.39	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.3	11.0	14.0	37
Jul-96	115.83	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	1.0	ND< 1.0	1.6	2.7	87
Oct-96	112.17	ND< 0.01	ND< 0.01	ND< 0.005	0.036	0.96	ND< 1.0	1.4	1.5	150
Jan-97	113.76	ND< 0.02	ND< 0.01	ND< 0.005	0.029	ND< 0.5	ND< 1.0	1.7	2.8	95
Apr-97	116.62	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.1	1.2	ND< 1.0	63
Jul-97	116.74	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	0.56	ND< 1.0	ND< 1.0	ND< 1.0	54
Oct-97	111.27	ND< 0.02	ND< 0.01	ND< 0.005	0.025	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	85
Jan-98	111.47	ND< 0.02	0.01	ND< 0.005	0.044	ND< 0.5	2.2	5.2	6.8	97
Apr-98	116.38	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.6	1.8	23
Jul-98	117.62	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	53
Oct-98	115.06	ND< 0.02	ND< 0.01	ND< 0.005	0.042	0.68	ND< 1.0	ND< 1.0	ND< 1.0	88
Jan-99	112.28	ND< 0.02	ND< 0.01	0.006	0.05	ND< 1.2	ND< 2.5	ND< 2.5	ND< 2.5	160
Apr-99	112.11	ND< 0.01	ND< 0.01	ND< 0.005	0.042	ND< 2.0	3.0	11	6.8	80
Jul-99	112.09	ND < 0.020	ND < 0.020	ND<0.010	0.068	ND <1.0	ND <1.0	1.3	ND <1.0	65
Oct-99	104.50	ND < 0.010	ND < 0.010	ND<0.0050	0.071	ND < 2.0	ND < 2.0	ND < 2.0	ND < 2.0	130
Jan-00	100.67	ND < 0.020	ND < 0.010	ND<0.0050	ND < 0.025	ND <1.0	ND <1.0	ND <1.0	ND <1.0	47

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW-9										
Jan-89	95.55	0.45	0.33	ND< 0.003	ND< 0.009	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	55
Apr-89	99.67	ND< 0.02	0.06	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	24
Jul-89	98.77	ND< 0.05	0.17	ND< 0.01	0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	57
Oct-89	95.62	2.5	1.8	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	110
Jan-90	96.44	2.28	2.2	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	100
Apr-90	98.26	0.8	0.81	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	150
Jul-90	99.78	0.03	0.04	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	64
Oct-90	98.69	0.25	0.19	ND< 0.005	0.062	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17
Jan-91	98.04	0.124	0.085	ND< 0.005	ND< 0.02	ND< 0.5	6.6	1.4	9.0	26
Apr-91	100.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	26
Jul-91	101.88	ND< 0.02	0.027	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	99.0	ND< 1.0	41
Oct-91	101.30	0.05	0.07	ND< 0.005	ND< 0.01	ND< 0.5	ND< 1.0	94.0	ND< 1.0	120
Jan-92	103.62	ND< 0.05	ND< 0.008	ND< 0.003	0.031	ND< 1	ND< 1.0	1220.0	92.0	45
Apr-92	106.27	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	2800.0	3600.0	6190.0	52
Jul-92	106.93	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	34000.0	7900.0	24000	N D 1000
Oct-92	104.3	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1000	83000.0	13000	58000	N D 1000
Jan-93	107.56	ND< 0.02	0.057	ND< 0.005	0.053	ND< 50	400.0	3900.0	5300.0	ND< 100
Apr-93	115.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	5100.0	4000.0	9200.0	110
Jul-93	115.81	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 16	ND< 33.0	160.0	74.0	1100
Oct-93	115.79	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	120.0	45.0	390
Jan-94	115.76	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	48.0	290.0	220.0	230
Apr-94	116.51	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 500	17000.0	12000	32000	270
Jul-94	117.03	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1000	56000.0	15000	40000	200
Oct-94	111.17	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 500	57000.0	11000	34000	350
Jan-95	112.25	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 250	8200.0	9800.0	2000.0	310
Apr-95	117.92	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	650.0	480.0	670
Jul-95	119.31	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	69.0	780.0	340.0	540
Oct-95	115.67	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	110.0	670.0	1900.0	320
Jan-96	113.73	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	100.0	4300.0	6100.0	500
Apr-96	117.00	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	3.3	5.5	24.0	22.0	580
Jul-96	116.49	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	4.6	ND< 2.0	42.0	4.3	570
Oct-96	112.73	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	2900.0	350.0	470
Jan-97	114.46	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	ND< 5.0	ND< 5.0	400
Apr-97	117.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	18.0	ND< 10.0	770
Jul-97	117.34	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	ND< 50.0	2500.0	860.0	850
Oct-97	113.75	ND< 0.02	0.048	ND< 0.005	ND< 0.02	ND< 25	150.0	1900.0	4800.0	ND< 50
Jan-98	112.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	690.0	260.0	270
Apr-98	117.07	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	23.0	ND< 10.0	390
Jul-98	118.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 12	ND< 25.0	73.0	ND< 25.0	1300
Oct-98	115.49	3.3	1.3	0.008	0.34	7.4	ND< 12.0	390.0	ND< 12.0	1200
Jan-99	112.68	3.3	2.4	ND< 0.005	ND< 0.02	ND< 6.2	ND< 12.0	100.0	83.0	550
Apr-99	112.77	ND< 0.01	0.64	ND< 0.005	ND< 0.025	ND< 5.0	ND< 5.0	ND< 5.0	ND< 5.0	350
Jul-99	112.57	5.8	5.6	ND< 0.010	ND< 0.050	ND< 25	ND< 25	ND< 25	ND< 25	810
Oct-99	104.91	4.0	4.2	ND< 0.0050	ND< 0.025	ND< 5.0	ND< 5.0	ND< 5.0	ND< 5.0	280
Jan-00	101.15	14.1	13.9	ND< 0.0050	ND< 0.025	ND< 5.0	ND< 5.0	ND< 5.0	ND< 5.0	170

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation ( Feet MSL)	METALS				PURGEABLE				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 11										
Jan-89	95.97	ND< 0.01	ND< 0.014	ND< 0.003	ND< 0.009	ND< 0.5	ND< 0.5	43.0	1.5	34
Apr-89	99.85	ND< 0.02	0.04	ND< 0.01	ND< 0.02	ND< 500	7500.0	2600.0	11000	39
Jul-89	98.95	ND< 0.05	ND< 0.02	ND< 0.01	0.13	ND< 7	ND< 10.0	ND< 10.0	90.0	29
Oct-89	95.77	ND< 0.05	ND< 0.02	ND< 0.01	ND< 0.05	ND< 5	ND< 10.0	200.0	ND< 10.0	35
Jan-90	96.72	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 5	ND< 5.0	83.0	ND< 10.0	46
Apr-90	98.44	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	2.6	370.0	150.0	33
Jul-90	100.00	ND< 0.02	ND< 0.01	ND< 0.01	0.03	ND< 25	440.0	1000.0	760.0	65
Oct-90	98.97	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	15000.0	3000.0	10000	ND< 1
Jan-91	98.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	15000.0	4700.0	12000	ND< 1
Apr-91	101.17	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	8500.0	3300.0	7500.0	63
Jul-91	102.19	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	57.0	520.0	220.0	61
Oct-91	101.61	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.5	140.0	2000.0	660.0	110
Jan-92	104.09	0.10	ND< 0.008	ND< 0.003	0.02	ND< 1	7.3	230.0	26.0	85
Apr-92	106.61	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.05	1.7	130.0	2.3	70
Jul-92	107.12	ND< 0.02	0.02	ND< 0.005	0.09	ND< 0.05	ND< 0.1	17.0	ND< 0.1	160
Oct-92	104.55	ND< 0.02	0.011	ND< 0.005	ND< 0.01	ND< 0.05	ND< 0.1	11.0	ND< 0.1	160
Jan-93	108.27	ND< 0.02	0.013	ND< 0.005	0.088	ND< 1.2	ND< 2.5	110.0	ND< 2.5	86
Apr-93	115.6	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	ND< 1.0	2.0	ND< 1.0	59
Jul-93	116.07	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	2.5	1.8	6.4	230
Oct-93	116.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.1	3.1	150
Jan-94	116.03	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.5	2.8	190
Apr-94	116.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	80
Jul-94	117.23	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1.6	180
Oct-94	111.30	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	4.5	ND< 1.0	360
Jan-95	112.53	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	660.0	850.0	1100.0	660
Apr-95	118.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	1900.0	1000.0	74
Jul-95	119.51	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	160.0	37.0	140
Oct-95	115.80	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	5.8	2.2	180
Jan-96	113.98	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	520.0	460.0	1000.0	620
Apr-96	117.37	ND< 0.02	ND< 0.01	ND< 0.005	0.023	ND< 25	160.0	1100.0	1400.0	240
Jul-96	116.75	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	ND< 20.0	460.0	290.0	220
Oct-96	112.95	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.9	20.0	8.0	250
Jan-97	114.78	ND< 0.02	ND< 0.01	ND< 0.005	0.029	ND< 0.5	9.4	84.0	88.0	160
Apr-97	117.60	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	120.0	8.2	370
Jul-97	117.61	ND< 0.02	ND< 0.01	ND< 0.005	0.15	ND< 2.5	ND< 5.0	8.3	ND< 5.0	240
Oct-97	114.02	ND< 0.02	ND< 0.01	ND< 0.005	0.1	ND< 2.5	ND< 5.0	ND< 5.0	ND< 5.0	350
Jan-98	112.23	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 12	770.0	1800.0	2200.0	390
Apr-98	117.36	ND< 0.02	ND< 0.01	ND< 0.005	0.077	ND< 1.2	63.0	150.0	210.0	180
Jul-98	118.57	ND< 0.02	ND< 0.01	ND< 0.005	0.077	ND< 1.2	ND< 2.5	41.0	4.8	150
Oct-98	115.91	ND< 0.02	ND< 0.01	ND< 0.005	0.041	ND< 5	ND< 10.0	ND< 10.0	ND< 10.0	430
Jan-99	113.05	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 6.2	260.0	750.0	970.0	690
Apr-99	113.14	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 25	670	1600	1270	480
Jul-99	112.88	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 10	ND < 10	85	ND < 10	740
Oct-99	105.05	0.057	0.02	ND < 0.0050	ND < 0.025	ND < 10	ND < 10	480	52	650
Jan-00	101.31	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 12	ND < 12	ND < 12	ND < 12	820

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	HALOCARBONS Trichloroethene (ug/L)
MW - 14S										
Oct-90	98.07	3.2	2.2	0.018	5.3	ND< 0.5	ND< 1.0	1750.0	ND< 1.0	180
Jan-91	97.38	0.4	0.94	0.007	1	ND< 0.5	ND< 1.0	2800.0	5900.0	108
Apr-91	99.26	0.39	0.41	0.005	0.15	ND< 0.5	ND< 1.0	4100.0	ND< 1.0	84
Jul-91	101.27	0.02	0.31	0.005	0.11	ND< 0.5	ND< 1.0	31.0	ND< 1.0	55
Oct-91	100.66	0.13	0.23	ND< 0.005	0.05	ND< 0.5	ND< 1.0	680.0	ND< 1.0	81
Jan-92	103.08	0.27	0.15	ND< 0.003	0.093	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	59
Apr-92	105.70	0.13	0.16	ND< 0.005	0.04	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	56
Jul-92	106.38	0.1	0.33	ND< 0.005	0.56	0.6	ND< 1.0	ND< 1.0	ND< 1.0	44
Oct-92	103.72	0.16	0.54	ND< 0.005	0.72	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	71
Jan-93	107.00	0.056	0.24	ND< 0.005	0.33	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	56
Apr-93	114.80	ND< 0.02	0.018	ND< 0.005	0.032	ND< 0.5	24.0	40.0	55.0	18
Jul-93	115.36	ND< 0.02	0.20	ND< 0.005	0.023	ND< 0.5	1.3	1.2	3.8	25
Oct-93	115.42	ND< 0.02	0.01	ND< 0.005	0.021	ND< 0.5	ND< 1.0	2.1	3.7	25
Jan-94	115.28	ND< 0.02	0.015	ND< 0.005	0.022	ND< 0.5	ND< 1.0	3.2	1.4	21
Apr-94	116.06	ND< 0.02	0.022	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	29
Jul-94	116.64	ND< 0.02	0.016	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	15
Oct-94	110.70	0.035	0.064	ND< 0.005	ND< 0.020	0.53	ND< 1.0	ND< 1.0	ND< 1.0	58
Feb-95	113.10	ND< 0.02	0.016	ND< 0.005	0.020	ND< 50	ND< 100.0	3000.0	690.0	50
Apr-95	117.50	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.020	ND< 5	76.0	120.0	190.0	20
Jul-95	118.93	ND< 0.02	ND< 0.01	0.006	ND< 0.020	ND< 0.5	2.8	26.0	12.0	22
Oct-95	115.25	0.022	0.046	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	2.1	2.0	35
Jan-96	113.13	ND< 0.02	0.034	ND< 0.005	0.024	ND< 1	4.7	87.0	58.0	42
Apr-96	116.52	0.021	0.028	ND< 0.005	ND< 0.020	ND< 2.5	54.0	120.0	110.0	51
Jul-96	116.04	ND< 0.01	0.069	ND< 0.005	ND< 0.020	0.58	ND< 1.0	20.0	10.0	37
Oct-96	112.22	0.052	0.082	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	13.0	2.9	61
Jan-97	113.85	0.024	0.031	ND< 0.005	ND< 0.020	ND< 2.5	ND< 5.0	470.0	ND< 5.0	90
Apr-97	116.82	ND< 0.02	0.032	0.005	ND< 0.020	0.58	2.9	91.0	36.0	45
Jul-97	117.21	ND< 0.02	0.016	ND< 0.005	ND< 0.020	ND< 5	ND< 1.0	14.0	1.0	35
Oct-97	113.39	0.1	0.013	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	20.0	1.8	57
Jan-98	111.43	* N D/O 0103	0.018	ND< 0.005	0.020	ND< 0.5	1.1	19.0	5.0	50
Apr-98	116.47	ND< 0.02	0.018	ND< 0.005	0.023	ND< 12	ND< 25.0	1500.0	150.0	38
Jul-98	117.79	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.020	0.51	ND< 1.0	18.0	8.4	18
Oct-98	115.19	0.032	0.044	ND< 0.005	0.027	ND< 1.2	ND< 2.5	120.0	29.0	62
Jan-99	112.31	0.058	0.032	ND< 0.005	ND< 0.020	1.1	ND< 2.0	77.0	64.0	98
Apr-99	112.21	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 12	ND< 12	820	47	84
Jul-99	112.19	ND < 0.020	0.038	ND < 0.0050	0.037	ND < 50	ND < 50	3,000	ND < 50	74
Oct-99	104.31	0.035	0.15	0.006	0.044	ND < 5.0	ND < 5.0	120	ND < 5.0	180
Jan-00	100.43	0.11	0.26	0.009	0.031	ND < 5.0	ND < 5.0	ND < 5.0	ND < 5.0	230

\* ND/10.3 = EPA method 7196/EPA Method 218.6 (Sample was analyzed for hexavalent chromium by two methods.)

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE				HALOCARBONS Trichloroethene (ug/L)
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 15S										
Oct-90	97.71	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	21
Jan-91	97.10	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	4.0	1.6	4.0	13
Apr-91	99.71	ND< 0.02	ND< 0.01	0.011	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	28
Jul-91	100.94	ND< 0.02	ND< 0.01	0.014	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17
Oct-91	100.35	ND< 0.02	0.01	0.02	0.06	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	13
Jan-92	102.72	ND< 0.051	ND< 0.008	0.008	0.01	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	15
Apr-92	105.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	4.1
Jul-92	105.95	ND< 0.02	0.04	0.005	0.27	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	2.9
Oct-92	103.37	ND< 0.02	ND< 0.02	0.007	0.047	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	N D 1
Jan-93	106.58	ND< 0.02	0.014	0.0085	0.1	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	9.0
Apr-93	114.41	ND< 0.02	0.013	ND< 0.005	ND< 0.02	ND< 0.5	14.0	10.0	22.0	4.6
Jul-93	115.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.2	ND< 1.0	2.4	2.4
Oct-93	115.07	ND< 0.04	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	3.2
Jan-94	114.90	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	1.9
Apr-94	115.72	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	3.1
Jul-94	116.31	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	2.1
Oct-94	110.42	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.0
Jan-95	111.14	0.048	0.044	ND< 0.005	ND< 0.02	ND< 1	4.0	64.0	27.0	3.7
Apr-95	117.15	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	60.0	82.0	130.0	2.8
Jul-95	118.61	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	2.5	18.0	12.0	5.2
Oct-95	114.45	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.0	ND< 1.0	3.9
Jan-96	112.69	ND< 0.02	0.012	ND< 0.005	ND< 0.02	ND< 0.5	1.8	25.0	22.0	3.8
Apr-96	116.09	ND< 0.02	0.015	ND< 0.005	ND< 0.02	ND< 0.5	13.0	40.0	45.0	2.8
Jul-96	115.69	ND< 0.01	0.014	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	9.7	5.4	3.2
Oct-96	111.81	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.9	2.6	5.3
Jan-97	113.42	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	5.5	69.0	1.0	5.1
Apr-97	116.35	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	9.3	21.0	8.5	3.3
Jul-97	116.60	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	8.2	1.3	4.1
Oct-97	113.08	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	17.0	1.7	5.2
Jan-98	111.06	* N D/0.0177	0.021	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	12.0	3.7	5.0
Apr-98	116.05	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	60.0	7.2	3.1
Jul-98	117.47	ND< 0.02	0.014	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	10.0	2.9	3.4
Oct-98	114.87	ND< 0.02	0.017	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	45.0	12.0	3.9
Jan-99	111.98	0.024	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	19.0	2.2	7.0
Apr-99	111.85	ND< 0.01	0.013	ND< 0.005	ND< 0.025	ND< 1.0	ND< 1.0	23	2.2	4.2
Jul-99	111.89	ND < 0.020	0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	29	23	3.9
Oct-99	104.07	0.014	0.015	ND < 0.0050	ND < 0.025	ND < 2.0	ND < 2.0	12	ND < 2.0	6.7
Jan-00	100.09	ND < 0.020	ND < 0.010	0.012	ND < 0.025	ND < 1.0	ND < 1.0	9.3	ND < 1.0	25

\* ND/0.0177 = EPA method 7196/EPA Method 218.6 (Sample was analyzed for hexavalent chromium by two methods.)

TABLE 6-1  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation ( Feet MSL)	METALS				PURGEABLE				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	
MW - 16										
Apr-92	105.99	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.5	0.7	1.0	1.6	52
Jul-92	106.7	ND< 0.02	0.03	ND< 0.02	0.35	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	35
Oct-92	104.07	ND< 0.02	0.011	ND< 0.005	0.15	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	72
Jan-93	107.3	ND< 0.02	ND< 0.01	ND< 0.005	0.44	ND< 1.2	ND< 2.5	ND< 2.5	ND< 2.5	51
Apr-93	114.9	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	55.0	2300.0	1200.0	42
Jul-93	115.54	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	3100.0	2000.0	15
Oct-93	115.51	ND< 0.04	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5.0	ND< 10.0	340.0	ND< 10.0	24
Jan-94	115.46	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.02	ND< 20.0	1000.0	ND< 20.0	22
Apr-94	116.25	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	ND< 20.0	820.0	ND< 20.0	37
Jul-94	116.78	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	ND< 50.0	1300.0	730.0	76
Oct-94	111.02	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.5	2.4	9.7	91
Jan-95	112.08	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17
Apr-95	117.60	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	16.0	36.0	55.0	34
Jul-95	118.99	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	ND< 20.0	* 540/370	ND< 20.0	67
Oct-95	115.45	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.8	1.3	60
Jan-96	113.49	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	11.0	9.7	26
Apr-96	116.72	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	9.8	30.0	33.0	36
Jul-96	116.24	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	6.6	3.6	110
Oct-96	112.59	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	49.0	130.0	230.0	73
Jan-97	114.18	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	4.6	23.0	ND< 2.0	32
Apr-97	117.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	ND< 2.0	7.2	2.4	31
Jul-97	117.12	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1.2	ND< 2.5	6.5	ND< 2.5	30
Oct-97	113.66	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	8.2	ND< 5.0	53
Jan-98	111.92	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	12.0	ND< 3.8	29
Apr-98	116.79	ND< 0.02	ND< 0.01	ND< 0.005	0.023	ND< 0.5	ND< 1.0	28.0	2.7	29
Jul-98	118.00	ND< 0.02	ND< 0.01	ND< 0.005	0.031	ND< 0.5	ND< 1.0	6.0	1.8	28
Oct-98	115.42	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	16.0	ND< 5.0	58
Jan-99	112.68	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1.0	ND< 2.0	11.0	ND< 2.0	36
Apr-99	112.59	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 2.0	ND< 2.0	6.1	ND< 2.0	39
Jul-99	112.43	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 2.0	ND < 2.0	33	ND < 2.0	29
Oct-99	104.81	ND < 0.010	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 5.0	42
Jan-00	101.03	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 1.0	18

ND = Below detection limit as noted

MSL = Mean Sea Level

\* 540/370 = original sample/duplicate sample (both results presented because duplicate result deviation is >20%)

TABLE 6-1 (Deep)  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring  
Historical Results

Monitor Well No. / Date	Groundwater Elevation ( Feet MSL)							PURGEABLE						
		Hexavalent Chromium (mg/L)		Total Chromium (mg/L)		Cadmium (mg/L)		Copper (mg/L)		Benzene (ug/L)	Toluene (ug/L)	Ethyl- Benzene (ug/L)	Total Xylenes (ug/L)	HALOCARBONS Trichloroethene (ug/L)
MW - 1D														
Jan-99	114.00	ND	0.02	ND	0.01	ND	0.005	ND	0.02	ND	0.5	ND	1	2
Apr-99	114.01	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	2.1
Jul-99	113.67	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	2.7
Oct-99	106.55		0.014	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	2
Jan-00	152.60	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	7.1
MW - 4A														
Jan-99	112.63		0.02		0.025	ND	0.005	ND	0.02	ND	0.5	ND	1	10
Apr-99	112.58	ND	0.02		0.012	ND	0.005	ND	0.025	ND	1	ND	1	7
Jul-99	112.46	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	5.2
Oct-99	104.64		0.017	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	4.5
Jan-00	152.46	ND	0.02		0.015	ND	0.005	ND	0.025	ND	1	ND	1	4.2
MW - 6D														
Jan-99	112.78	ND	0.02	ND	0.01	ND	0.005	ND	0.02	ND	0.5		1.2	7.1
Apr-99	112.62	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1		4	10
Jul-99	112.43	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	23
Oct-99	105.1	ND	0.01	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	8.8
Jan-00	150.13	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	9.2
MW -15D														
Jan-99	111.92	ND	0.02	ND	0.01	ND	0.005	ND	0.02	ND	0.5	ND	1	5.4
Apr-99	111.81	ND	0.02		0.35	ND	0.005	ND	0.025	ND	1	ND	1	25
Jul-99	111.74	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	9
Oct-99	103.88	ND	0.01	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	5.1
Jan-00	150.96	ND	0.02	ND	0.01	ND	0.005	ND	0.025	ND	1	ND	1	9.7

TABLE 6-2  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring Well Sampling  
Purgeable Halogenated Organic Analytical Results  
(µg/L)

Well Identification	Tetrachloro-ethene (PCE)	Trichloro-ethene (TCE)	1,1-Dichloro-ethene (1,1-DCE)	1,1-Dichloro-ethane (1,1-DCA)	1,2-Dichloro-ethane (1,2-DCA)	Carbon Tetrachloride (CCL4)	Chloroform (CHCL3)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	trans-1,2-Dichloro-ethene (trans-1,2-DCE)	Methylene Chloride (CH2CL2)
PTI- MW01S	31	9.9	ND<1.0	1.9	1.5	ND <1.0	ND <1.0	2.8	ND <1.0	ND <1.0
PTI- MW01D	21	7.1	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW03	19	170	30	18	ND < 2.5	40	27	8.0	ND < 2.5	ND < 2.5
PTI- MW04	8.8	160	85	160	18	ND <2.5	18	170	4.9	100
PTI- MW04A	1.8	4.2	ND <1.0	ND < 1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06B	17	13	2.4	2.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06D	16	9.2	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW07	9.8	47	9.1	29	2.2	ND <1.0	1.1	13	2.3	ND <1.0
PTI- MW09	ND<5.0	170	52	170	38	ND<5.0	150	7.0	ND<5.0	300
PTI- MW11	22	820	100	230	22	ND <12	29	50	ND <12	ND <12
PTI- MW14S	ND<5.0	230	69	81	31	35	29	14	ND<5.0	5.7
PTI- MW15S	ND<1.0	25.0	5.3	10	23	ND<1.0	2.9	13	ND<1.0	ND<1.0
PTI- MW15D	5.3	9.7	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW16	ND<1.0	18	14	69	7.5	ND<1.0	ND<1.0	15	3.4	ND<1.0
MCL	5.0	5.0	6.0	5.0	0.5	0.5	NE	6.0	10	5.0
SGV GW*	ND-1.1	ND-1.3	ND	ND	ND	ND	ND	ND	ND	ND

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected

MW = Monitoring Well

MCL = Maximum Contaminant Limit

SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area during the year 1998.

NA = Not Available

\* - Up to 65 regulated and unregulated organics were analyzed. Only those detected at or above the reporting limit are listed.

NE = Not Established

TABLE 6-3  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring Well Sampling  
Purgeable Aromatic Organic Analytical Results  
(µg/L)

Well Identification	Benzene	Toluene	Ethylbenzene	Xylenes (Total)
PTI- MW01S	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW01D	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW03	ND <2.5	ND <2.5	<b>54</b>	<b>70</b>
PTI- MW04	<b>5.1</b>	ND < 2.5	ND < 2.5	<b>6.0</b>
PTI- MW04A	ND <1.0	ND <1.0	ND <1.0	ND < 1.0
PTI- MW06B	ND <1.0	ND <1.0	<b>2.0</b>	ND < 1.0
PTI- MW06D	ND <1.0	ND <1.0	<b>1.8</b>	ND < 1.0
PTI- MW07	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW09	ND <5.0	ND <5.0	ND <5.0	ND <5.0
PTI- MW11	ND <12	ND <12	ND <12	ND <12
PTI- MW14S	ND <5.0	ND <5.0	ND < 5.0	ND < 5.0
PTI- MW15S	ND <1.0	ND <1.0	<b>9.3</b>	ND <1.0
PTI- MW15D	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW16	ND <1.0	ND <1.0	ND <1.0	ND <1.0
<b>MCL</b>	<b>1.0</b>	<b>150</b>	<b>700</b>	<b>1,750</b>
<b>SGV GW</b>	<b>ND</b>	<b>ND</b>	<b>ND</b>	<b>ND</b>

All analyses performed by EPA Method 8260.

ND = Analytical parameter not detected

MW = Monitoring Well

MCL = Maximum Contaminant Limit

SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area during the year 1998.

TABLE 6-4  
PHIBRO-TECH, INC.  
January 2000 Quarterly Monitoring Well Sampling  
Inorganic Analytical Results  
(mg/L)

Well Identification	Cadmium	Chromium (Hexavalent)	Chromium (Total)	Copper	pH
	EPA- 6010B	EPA- 7196A	EPA- 6010B	EPA- 6010B	EPA- 150.1
PTI- MW01S	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	7.0
PTI- MW01D	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	7.3
PTI- MW03	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	7.2
PTI- MW04	0.32	76.3	60.0	ND < 0.050	6.7
PTI- MW04A	ND < 0.0050	ND < 0.020	0.015	ND < 0.025	7.8
PTI- MW06B	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	7.4
PTI- MW06D	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	7.4
PTI- MW07	ND<0.0050	ND < 0.020	ND < 0.010	ND < 0.025	7.3
PTI- MW09	ND < 0.0050	14.1	13.9	ND < 0.025	7.0
PTI- MW11	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	6.9
PTI- MW14S	0.0094	0.11	0.26	0.031	7.2
PTI- MW15S	0.012	ND < 0.020	ND < 0.010	ND < 0.025	7.3
PTI- MW15D	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	8.4
PTI- MW16	ND < 0.0050	ND < 0.020	ND<0.010	ND < 0.025	7.2
MCL	0.005	NE	0.05	1.3*	NE
SGV GW	ND	ND	ND	ND - 0.67	7.0 - 8.5

mg/L - milligrams per liter

ND = Analytical parameter not detected.

NA = Parameter not analyzed

MW = Monitoring Well

MCL = Maximum Contaminant Limit

SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area  
in the year 1996.

NE = Not established

\* California Drinking Water Action Level

## Section 7

# Statistical Evaluation

The following sections contain a statistical treatment of the monitoring data designed to determine if onsite wells have been impacted by metals, BTEX compounds (benzene, toluene, ethylbenzene, xylenes) or TCE (trichloroethene). The procedures used are based on the recommendations provided in the 1989 EPA Guidance document, Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities - Interim Final Guidance and in the 1992 Addendum document. In some instances, methods which have not been recommended in the documents cited above were used. However, unrecommended techniques were only used to supplement the recommended procedures. When statistical methods outlined in the 1989 guidance document were superseded by the 1992 Addendum, the more recent recommendations were followed.

### 7.1 Determination of Background Upper Tolerance Limit Overview

The upper tolerance limit (UTL) is a method that is typically used in compliance monitoring to compare downgradient wells to established maximum contaminant levels (MCLS) or alternate contaminant levels (ACLs). In short, the UTL represents the upper end of the tolerance interval, which is calculated at a specified confidence level and coverage. For instance, a UTL with 95 percent coverage and a 95 percent confidence level represents a value which, with 95 percent confidence, will be exceeded less than 5 percent of the time.

In the present evaluation, we have calculated UTLs for the background well (MW-1S) and compared this value to each individual downgradient analytical result using a confidence level and coverage of 95 percent. When onsite wells exceed the background UTL consistently, it suggests that a significant difference from background may exist. While this is not a recommended technique for detection monitoring, we have applied background UTLs as a screening tool and as a supplement to the more rigorous statistical comparisons that follow.

### Methods

Inherent in the calculation of a parametric UTL is the assumption of a normal (or log normal) data distribution. One of the tests for normality recommended in the 1992 Addendum to the EPA guidance document is the probability plot. When a data set is normally distributed, the corresponding probability plot is linear. However, for the background well, the analyses have a high percentage of nondetects for most parameters. Therefore, the probability plots appear to be nonlinear (see Appendix E-3). Fortunately, several methods are available to adjust the mean and standard deviation (used in the calculation of the UTL) based on various treatment of nondetects that allow the use of a parametric UTL. In a parametric UTL, the magnitude of the analyses are considered, while in a nonparametric analysis, the data

is ranked from highest to lowest and the UTL is calculated from the ranks. The choice of method depends on the percentage of nondetects in the population and on comparison of special probability plots designed to test the assumptions built into each model. Parametric methods for determination of the UTL are described below. When the percentage of nondetects is above 90 percent, the UTL is calculated using a nonparametric method employing the Poisson model. In the Poisson model, detected values are treated as "rare events," such that the probability of occurrence is low, but constant. The model takes into account both the frequency of occurrence of detected values as well as the magnitude. Since the Poisson model is nonparametric, a normal or log normal data distribution is not required.

When the frequency of detect is greater than 10 percent and data are normally or log normally distributed, either the Atchison or Cohen adjustment is recommended. In the Atchison method, nondetects are assumed to equal zero, and therefore are not considered in the data distribution. In the Cohen adjustment, nondetects are assumed to have finite values between zero and the detection limit. Experience at EPA and USGS (EPA 1992) have shown that, in general, when the frequency of detect (FOD) is between 10 and 50 percent, Atchison's method is more valid; while between 50 and 90 percent FOD, Cohen's method is more valid. However, this is only a rule of thumb that should be verified periodically using the detects-only and censored probability plot method described above.

## Results

The frequencies of detection for each parameter in the background well (MW-1S) is provided in Table 7-1. For hexavalent chromium, cadmium, and benzene, the FOD was less than 10 percent and the Poisson nonparametric method was used to calculate the UTL. Total chromium, copper, toluene, ethylbenzene, and total xylenes analyses were all between 10 and 50 percent FOD, suggesting that the Atchison adjustment should be employed before calculating the UTL. For trichloroethene (TCE), the data were both normally and log normally distributed (see Appendices E-2 and E-3) and the FOD was 100 percent; therefore, no adjustment was required, and the UTL was calculated directly.

The results of the UTL calculations and the comparison with each onsite well are presented in Table 7-2. Based on the number of analyses above the UTL for each onsite well, MW-3, MW-4, MW-7, MW-9, and MW-11 appear to differ from background with respect to the BTEX compounds. MW-4, MW-9, and MW-14S also appear to differ from background with respect to total chromium and copper. Note that the comparison of background UTLs to onsite wells described above is not definitive and will only be used in conjunction with the more in-depth statistical approaches that follow.

## 7.2 Comparison of Background and Onsite Wells

### Overview

The recommended method for comparing onsite wells to background is the analysis of variance (ANOVA). There are two types of ANOVA parametric and nonparametric. In order to use the parametric ANOVA, the data set must be normally or log normally distributed and the group variances must be equal. For the nonparametric approach, neither normality or equal variances are required, however, slightly larger datasets are needed to use a nonparametric method compared to the parametric ANOVA. The minimum number of analyses for the nonparametric test is 9, while for the parametric test, only 6 are required (EPA 1989).

The first assumption (normal or log normal distribution) should be tested using either the Shapiro-Wilk or probability plot method when the sample size is 50 or less. In general, the Shapiro-Wilk test is much more stringent than the probability plot since the method tends to focus on the "tails" of the distribution. The Lillifors, while not recommended in the Addendum, was suggested in the Interim Final Guidance (EPA 1989) and has been included for comparative purposes.

The test for equal group variances suggested in the Addendum to the Interim Final Guidance (EPA 1992) is the box plot. In a box plot, the extent of each box represent the 25th and 75th percentiles of the data set. Therefore, a long box tends to represent a larger variance than a short box. EPA (1992) recommends using a nonparametric ANOVA if the length of the largest box is equal to or greater than three times that of the smallest box. Another suggested criteria for a parametric ANOVA is a combined FOD, for both the background and the onsite well under consideration, of greater than 50 percent.

### Methods

Normality tests were performed only for TCE, since for the other parameters, the combined FOD was <50 percent, precluding the use of the parametric ANOVA method. Results of the probability plot, and Shapiro-Wilk tests are presented in Table 7-3, while the raw data are in Appendices E-2 and E-3, respectively. Due to the stringent nature of the Shapiro-Wilk test, less weight was given to this test than the probability plots when conflicting results were obtained. Based on Table 7-3, the TCE data are log normal in all wells except MW-3, MW-6B, MW-9, and MW-4. The log normal data distribution is typical of environmental datasets where various degrees of dilution have occurred. The lack of normality or log normality precluded the use of a parametric ANOVA for wells MW-3 MW-6B, and MW-9.

In order to test the equal group variances assumption, box plots were constructed for TCE in each well (see Appendix E-4). The results indicate that the background box is less than the length of the box for well MW-6B, indicating that this well cannot be compared to background using a parametric ANOVA. However, all other wells met the equal variance requirement.

A summary of the ANOVA method used is as follows:

MW-4, MW-11, MW-14S, MW-15S, and MW-16 for TCE parametric ANOVA  
using ½ D.L. for nondetects

All other parameters and wells - nonparametric, Kruskal Wallis Mann  
Whitney U Test

Note that ½D.L. was used when the FOD was greater than 85 percent in a single well.

## Results

The results of the nonparametric and parametric ANOVA tests are included in Appendices E-2 and E-3, respectively, while a summary is provided in Table 7-3. An "R" indicates that the null hypothesis was rejected, or that the two wells are not the same, while an "A" indicates the null hypothesis was accepted. In general, the results are similar to the UTL comparisons; except well MW-16 appears to differ from background with respect to the BTEX compounds. The results for TCE were obtained using both the normal and log normal assumptions for comparative purposes. The results indicate that, regardless of the data distribution, only well MW-6B was the same as background with respect to TCE. Since last quarter well MW-7 is now different than background with respect to copper, while well MW-15S is now different from background with respect to total chromium and toluene.

Table 7-1 Percent of Total Samples in Shallow Wells Reported Above the Detection Limit Quarterly Data:  
January 1989 to January 2000 at Philbro-Tech, Inc.

Parameter	MW-1S	MW-3	MW-4	MW-6B	MW-7	MW-9	W-11	MW-14S	MW-15S	MW-16
Number Samples (n)	45	45	45	41	45	44	45	37	38	32
<b>Metals (mg/L) (%)</b>										
Hexavalent chromium	2.3	2.3	100.0	0	2.3	25.6	2.3	48.6	5.6	0
Total chromium	11.6	7.0	97.7	28.2	20.9	37.2	11.6	80.0	36.1	6.7
Cadmium	2.3	0	97.7	0	4.7	4.7	0	17.1	19.4	0
Copper	25.6	11.6	32.6	5.1	44.2	11.6	25.6	54.3	13.9	16.7
<b>Aromatics (µg/L) (%)</b>										
Benzene	2.3	11.6	18.6	0	20.9	7.0	0	17.1	0	0
Toluene	9.5	16.7	35.7	42.1	16.7	38.1	45.2	20.6	28.6	20.7
Ethylbenzene	30.2	53.5	86.0	46.2	46.5	69.8	88.4	77.1	58.3	83.3
Total xylenes	32.6	41.9	86.0	48.7	34.9	58.1	72.1	62.9	58.3	50.0
<b>Halocarbons (µg/L) (%)</b>										
Trichloroethene	100.0	97.7	93.0	100.0	100.0	93.0	95.3	100.0	97.2	100.0

% = Percent detected

**Table 7-2 Definition of Upper Tolerance Levels in Background Shallow Wells Quarterly Data:  
January 1989 to January 2000 at Philbro-Tech, Inc.**

Parameter	% Detected in Bkgd <sup>1</sup>	Tolerance Limit Method	Upper Tolerance Limit <sup>2</sup>	Upper Tolerance Limit Exceeded								
				MW-3 45 <sup>3</sup>	MW-4 45	MW-6B 41	MW-7 45	MW-9 44	MW-11 45	MW-14S 37	MW-15S 38	MW-16 32
Metals (mg/L)												
Hexavalent chromium	2.3	P	1.00	1	43 <sup>4</sup>	-	-	7	-	1	-	-
Total chromium	11.4	A	0.045	2	45 (1)	1	2	16	-	17 (1)	-	-
Cadmium	2.3	P	0.5	-	12	-	-	-	-	-	-	-
Copper	25.0	A	0.031	4 (1)	12 (5)	3 (1)	16 (2)	4 (1)	8 (1)	13	4	3
Aromatics (µg/L)												
Benzene	2.3	P	21.0	3 (3) <sup>5</sup>	8 (7)	1 (1)	5 (4)	14 (14)	6 (6)	1 (1)	-	3 (3)
Toluene	9.3	A	1.29	17 (10)	36 (21)	14 (1)	14 (8)	34 (18)	35(16)	14 (8)	11 (2)	19 (14)
Ethylbenzene	29.6	A	2.33	17 (3)	40 (3)	14 (1)	16 (4)	37 (8)	40 (3)	26 (1)	21	26 (3)
Total xylenes	31.8	A	4.89	16 (5)	42 (4)	15	11 (4)	36 (12)	32 (7)	18 (3)	11	15 (7)
Halocarbons (µg/L)												
Trichloroethene	100.0	T	20.74	35 (1)	45 (3)	10	43	44 (3)	43	33	3	29

<sup>1</sup> MW-1S is background shallow well, n = 45

<sup>2</sup> In ppm or ppb, as noted for groups

<sup>3</sup> Number of samples collected at corresponding well

<sup>4</sup> Number of samples that exceed upper tolerance level at corresponding well

<sup>5</sup> (6) number of samples exceeding limit that are reported as ND

- = None of samples exceeded the upper tolerance limit

P = Poisson

A = Atchison adjusted

T = Unadjusted limit

**Table 7-3 Comparison of Background and Onsite Shallow Wells Quarterly Data:  
January 1989 to January 2000 at Phibro-Tech, Inc.**

Parameter	MW-3	MW-4	MW-6B	MW-7	MW-9	MW-11	MW-14S	MW-15S	MW-16
<b>Metals (mg/L)</b>									
Hexavalent chromium <sup>1</sup>	A	R	A	A	R	A	R	A	A
Total chromium <sup>1</sup>	A	R	R	A	R	A	R	R	A
Cadmium <sup>1</sup>	A	R	A	A	A	A	A	A	A
Copper <sup>1</sup>	A	A	A	R	A	A	R	A	A
<b>Aromatics (µg/L)</b>									
Benzene <sup>1</sup>	R	R	A	R	R	R	R	A	R
Toluene <sup>1</sup>	R	R	R	R	R	R	R	R	R
Ethylbenzene <sup>1</sup>	R	R	R	R	R	R	R	R	R
Total xylenes <sup>1</sup>	R	R	A	A	R	R	R	A	R
<b>Halocarbons (µg/L)</b>									
Trichloroethene <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup> /R <sup>5</sup>	A <sup>3</sup>	R <sup>3</sup>	R/R	R <sup>3</sup>	R/R	R/R	R/R

<sup>1</sup> Background to onsite comparison by Mann Whitney U Method, using D.L. for ND, at 95 percent confidence level

<sup>2</sup> Background to onsite comparison by one way ANOVA Method using 1/2 D.L. for ND

<sup>3</sup> Nonparametric comparison used for TCE

<sup>4</sup> Normal Distribution used in comparison

<sup>5</sup> Log normal Distribution used in comparison

A Null Hypothesis, that means are equal, is accepted

R Null Hypothesis, that means are equal, is rejected

R/R Null Hypothesis, rejected using parametric (top letter) and nonparametric (bottom letter) tests

## Section 8

# Assessment of Quarterly Groundwater Monitoring Program Status

In the October 1990 groundwater monitoring report, changes in the quarterly groundwater sampling program were proposed. These changes were first implemented during the April 1991 sampling event and included reducing the number of wells sampled and parameters analyzed in each well. The current groundwater sampling program will only be used as an interim groundwater sampling program, until a remediation alternative from the Corrective Measures Study (CMS) has been selected by EPA. Based on 15 years of quarterly monitoring at the site, off-site migration of the soluble metals plume has not been observed. Therefore, as discussed previously in the October 1999 monitoring report, the sampling frequency will be modified from quarterly to semi-annually effective April 2000.

The analytical parameters for the January 2000 quarterly monitoring were as follows:

Wells	Purgeable Halogenated/ Aromatic Organics (EPA 8260)	Chromium, Cadmium, Copper	Hexavalent Chromium	pH
MW-01S, MW-01D	X	X	X	X
MW-03, MW-04A	X	X	X	X
MW-11 MW-06B	X	X	X	X
MW-06D, MW-07	X	X	X	X
MW-09, MW-04	X	X	X	X
MW-14S, MW-15S	X	X	X	X
MW-15D, MW-16	X	X	X	X

Beginning with the January 1997 sampling event, EPA Method 8010/8020 was replaced with EPA Method 8260. This change was requested by the analytical laboratory, which no longer performs 8010/8020 analysis. Methyl tertiary butyl ether (MTBE) analysis was performed once, in January 1997. Since there were no detections of MTBE in any of the groundwater samples, this analysis was discontinued.

Statistical analysis was historically conducted annually. Beginning with the October 1993 sampling event, statistical analysis has been performed on a quarterly basis, as requested by DTSC.

The proposed April 2000 quarterly monitoring includes sampling the 14 wells for purgeable halogenated/aromatic organics using EPA Method 8260, chromium, cadmium, copper, hexavalent chromium, and pH. The water levels at the 14 wells sampled, in addition to the remaining unsampled wells, will also be measured.

## Section 9

# References

Camp Dresser & McKee Inc., Groundwater Modeling Study, Southern California Chemical, January 1993.

\_\_\_\_\_, RCRA Facility Investigation Work Plan Addendum, Southern California Chemical, February 13, 1992, Revised March 6, 1992.

\_\_\_\_\_, RCRA Facility Investigation Report, Southern California Chemical, December 6, 1991.

\_\_\_\_\_, RCRA Facility Investigation Work Plan, Southern California Chemical, June 26, 1990.

\_\_\_\_\_, Current Conditions Report, Southern California Chemical, June 8, 1990.

City of Santa Fe Springs, 1996 Annual Water Quality Report, 1996.

J.H. Kleinfelder & Associates, Quality Assurance Project Plan, Southern California Chemical, May 1988.

\_\_\_\_\_, Draft Environmental Assessment, Southern California Chemical, January 1986.

Appendix A  
General Analytical Detection Limits

TABLE A-1  
PHIBRO-TECH, INC.  
HEAVY METALS AND INORGANICS ANALYSIS  
Typical Detection Limits

Method Number	Analytical Parameter	Detection Limit	Units
EPA 6010-L	Antimony	0.06	mg/L
EPA 6010-L	Barium	0.01	mg/L
EPA 6010-L	Beryllium	0.002	mg/L
EPA 6010-L	Cadmium	0.005	mg/L
EPA 6010-L	Chromium	0.01	mg/L
EPA 6010-L	Cobalt	0.01	mg/L
EPA 6010-L	Copper	0.02	mg/L
EPA 6010-L	Lead	0.05	mg/L
EPA 6010-L	Molybdenum	0.02	mg/L
EPA 6010-L	Nickel	0.04	mg/L
EPA 6010-L	Silver	0.01	mg/L
EPA 6010-L	Thallium	0.5	mg/L
EPA 6010-L	Tin	0.1	mg/L
EPA 6010-L	Vanadium	0.01	mg/L
EPA 6010-L	Zinc	0.02	mg/L
EPA 7196	Chromium, Hexavalent	0.02	mg/L
EPA 7061-L	Arsenic	0.005	mg/L
EPA 9012	Cyanide, Total	0.01	mg/L
EPA 7470	Mercury	0.001	mg/L
EPA 300.0	Chloride	5	mg/L
EPA 300.0	Nitrate	0.2	mg/L
EPA 7741-L	Selenium	0.1	mg/L
EPA 376.2	Sulfide, as Sulfur	1.2	mg/L

TABLE A-2  
PHIBRO-TECH, INC.  
VOLATILE ORGANIC COMPOUNDS  
Typical Detection Limits

Method Number	Analytical Parameter	Detection Limit	Units
EPA 8260	Benzene	0.5	µg/L
EPA 8260	Toluene	1.0	µg/L
EPA 8260	Ethylbenzene	1.0	µg/L
EPA 8260	Xylenes, Total	1.0	µg/L
EPA 8260	Chloromethane	1.0	µg/L
EPA 8260	Bromomethane	1.0	µg/L
EPA 8260	Vinyl Chloride	1.0	µg/L
EPA 8260	Chloroethane	1.0	µg/L
EPA 8260	Methylene Chloride	1.0	µg/L
EPA 8260	Trichlorofluoromethane	1.0	µg/L
EPA 8260	1,1-Dichloroethene	1.0	µg/L
EPA 8260	1,1-Dichloroethane	1.0	µg/L
EPA 8260	trans-1,2-Dichloroethene	1.0	µg/L
EPA 8260	Chloroform	1.0	µg/L
EPA 8260	1,2-Dichloroethane	1.0	µg/L
EPA 8260	1,1,1-Trichloroethane	1.0	µg/L
EPA 8260	Carbon Tetrachloride	1.0	µg/L
EPA 8260	Bromodichloromethane	1.0	µg/L
EPA 8260	1,2-Dichloropropane	1.0	µg/L
EPA 8260	trans-1,3-Dichloropropene	1.0	µg/L
EPA 8260	Trichloroethene	1.0	µg/L
EPA 8260	Dibromochloromethane	1.0	µg/L
EPA 8260	1,1,2-Trichloroethane	1.0	µg/L
EPA 8260	cis-1,3-Dichloropropene	1.0	µg/L
EPA 8260	2-Chloroethylvinyl ether	1.0	µg/L
EPA 8260	Bromoform	1.0	µg/L
EPA 8260	Tetrachloroethene	1.0	µg/L
EPA 8260	1,1,2,2-Tetrachloroethane	1.0	µg/L
EPA 8260	Chlorobenzene	1.0	µg/L
EPA 8260	1,2-Dichlorobenzene	1.0	µg/L
EPA 8260	1,3-Dichlorobenzene	1.0	µg/L
EPA 8260	1,4-Dichlorobenzene	1.0	µg/L

Appendix B  
Quanterra Analytical Reports

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1721 South Grand Ave.  
Santa Ana, CA 92705

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Fax (714) 258-0921

February 3, 2000

QUANTERRA INCORPORATED LOT NUMBER: **E0A250216**  
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin  
Camp, Dresser, McKee  
18881 Von Karman, Suite 650  
Irvine, CA 92612

Dear Ms. Wallin,

This report contains the analytical results for the two samples received under chain of custody by Quanterra Incorporated on January 25, 2000. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,



David Kammerer  
Project Manager

cc: Project File

**QUANTERRA INC. - SANTA ANA**

Date: 1/25/00

Quantims Lot #: EOA 250216

Client Name: CPM

Received by: R MARTIN

—

N	A
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Day 123

\*\*\*\*\* LEAVE NO BLANK SPACES ; USE N/A \*\*\*\*\*

[illegible]

n/f/l;HNO3 Lab filtered

LOGGED BY/DATE: ( am ) ( 1 / 25 / 00 )

REVIEWED BY/DATE: \_\_\_\_\_

# DEPENDABLE EXPRESS SERVICE, INC.

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(626) 913-2273

Nº 127923

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MESSAGE	24 HOUR SERVICE	DATE
		1-25-00

CHARGE TO	
Dunerra	
ADDRESS	SUITE #
1721 S. Grand Ave	
AUTHORIZED BY	REF
	340

PICK UP FROM:	
Phibro Tech	
STREET AND NUMBER	SUITE #
8851 Dille Rd.	
CITY	ZIP CODE
San Fe Springs	90670

DELIVER TO:	
Dunerra	
STREET AND NUMBER	SUITE #
1721 S. Grand Ave	
CITY	ZIP CODE
San An	

RETURN		YES		NO	
P/U TIME	DEL TIME	COMMODITY			
	5:28 P.M.				
WAITING TIME	25 MIN.	WEIGHT	10 LBS.	NO. PCS.	1

SPECIAL INSTRUCTIONS:	
Att: Rob Lopez (CDM)	
Ed Vigil	
RECEIVED BY (PLEASE SIGN LEGIBLY)	
X	
RETURN RECEIVED BY (PLEASE SIGN LEGIBLY)	
X	
1/25/00 17:28	

FOR OFFICE USE ONLY	
DEL. CHG.	
RETURN	
RUSH	
EXP.	
NIGHT OR HOLIDAY	
WAITING TIME	
EXTRA WEIGHT	
SUB TOTAL	
CASH ADVANCE	
TOTAL	

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PINK-CUSTOMER

# ANALYTICAL METHODS SUMMARY

E0A250216

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>
pH Aqueous	SW846 9040B
Hexavalent Chromium	SW846 7196A
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Volatile Organics by GC/MS	SW846 8260B

## References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

E0A250216

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
D7V3W	001	PTI-MW1D-046	01/25/00	15:00
D7V41	002	PTI-TB1-046	01/25/00	

## NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1D-046

DISSOLVED Metals

Lot-Sample #...: E0A250216-001

Matrix.....: WATER

Date Sampled...: 01/25/00 15:00 Date Received...: 01/25/00 17:28

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0028279						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31/00	D7V3W104
		Analysis Time...: 16:50		MS Run #.....: 0028161	MDL.....: 0.00050	
Chromium	0.010	0.010	mg/L	SW846 6010B	01/31/00	D7V3W105
		Analysis Time...: 16:50		MS Run #.....: 0028161	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31/00	D7V3W106
		Analysis Time...: 16:50		MS Run #.....: 0028161	MDL.....: 0.0040	

Client Sample ID: PTI-MW1D-046

Lot-Sample #....	E0A250216-001	Work Order #....	D7V3W101	Matrix.....	WATER
Date Sampled....	01/25/00 15:00	Date Received...	01/25/00 17:28	MS Run #.....	0027185
Prep Date.....	01/26/00	Analysis Date...	01/27/00		
Prep Batch #....	0027499	Analysis Time...	00:07		
		Method.....	SW846 8260B		

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
<b>Tetrachloroethene</b>	<b>21</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
<b>Trichloroethene</b>	<b>7.1</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	99	(70 - 130)
1,2-Dichloroethane-d4	89	(60 - 140)
Toluene-d8	108	(70 - 130)

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1D-046

General Chemistry

Lot-Sample #....: E0A250216-001    Work Order #....: D7V3W    Matrix.....: WATER  
 Date Sampled....: 01/25/00 15:00    Date Received...: 01/25/00 17:28

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.3	0.10	No Units	SW846 9040B	01/25/00	0026389
		Analysis Time..: 20:57		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/25/00	0026385
		Analysis Time..: 23:12		MS Run #.....:	MDL.....: 0.010	

**Client Sample ID: PTI-TB1-046**

Lot-Sample #....	E0A250216-002	Work Order #....	D7V41101	Matrix.....	WATER
Date Sampled....	01/25/00	Date Received...	01/25/00 17:28	MS Run #.....	0027185
Prep Date.....	01/26/00	Analysis Date...	01/26/00		
Prep Batch #....	0027499	Analysis Time...	23:37		
		Method.....	SW846 8260B		

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
Trichloroethene	ND	1.0	ug/L	0.20
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	97	(70 - 130)
1,2-Dichloroethane-d4	83	(60 - 140)
Toluene-d8	107	(70 - 130)

# QC DATA ASSOCIATION SUMMARY

E0A250216

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	SW846 7196A		0026385	
	WATER	SW846 9040B		0026389	
	WATER	SW846 8260B		0027499	0027185
	WATER	SW846 6010B		0028279	0028161
002	WATER	SW846 8260B		0027499	0027185

# METHOD BLANK REPORT

## GC/MS Volatiles

Client Lot #...: E0A250216  
MB Lot-Sample #: E0A270000-499

Work Order #...: D8024101

Matrix.....: WATER

Prep Date.....: 01/26/00

Analysis Time...: 22:36

Analysis Date...: 01/26/00

Prep Batch #...: 0027499

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Benzene	ND	1.0	ug/L	SW846 8260B
Bromodichloromethane	ND	1.0	ug/L	SW846 8260B
Bromoform	ND	1.0	ug/L	SW846 8260B
Bromomethane	ND	2.0	ug/L	SW846 8260B
Carbon tetrachloride	ND	1.0	ug/L	SW846 8260B
Chlorobenzene	ND	1.0	ug/L	SW846 8260B
Dibromochloromethane	ND	1.0	ug/L	SW846 8260B
Chloroethane	ND	2.0	ug/L	SW846 8260B
Chloroform	ND	1.0	ug/L	SW846 8260B
Chloromethane	ND	2.0	ug/L	SW846 8260B
1,2-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,3-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,4-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,1-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,2-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,1-Dichloroethene	ND	1.0	ug/L	SW846 8260B
cis-1,2-Dichloroethene	ND	1.0	ug/L	SW846 8260B
trans-1,2-Dichloroethene	ND	1.0	ug/L	SW846 8260B
1,2-Dichloropropane	ND	1.0	ug/L	SW846 8260B
cis-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
trans-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
Ethylbenzene	ND	1.0	ug/L	SW846 8260B
Methylene chloride	ND	1.0	ug/L	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	SW846 8260B
Tetrachloroethene	ND	1.0	ug/L	SW846 8260B
Toluene	ND	1.0	ug/L	SW846 8260B
1,1,1-Trichloroethane	ND	1.0	ug/L	SW846 8260B
1,1,2-Trichloroethane	ND	1.0	ug/L	SW846 8260B
Trichloroethene	ND	1.0	ug/L	SW846 8260B
Trichlorofluoromethane	ND	2.0	ug/L	SW846 8260B
Vinyl chloride	ND	2.0	ug/L	SW846 8260B
m-Xylene & p-Xylene	ND	1.0	ug/L	SW846 8260B
o-Xylene	ND	1.0	ug/L	SW846 8260B

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	100	(70 - 130)
1,2-Dichloroethane-d4	85	(60 - 140)
Toluene-d8	108	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: E0A250216

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	ND	Work Order #: D7WDA101		MB Lot-Sample #:	E0A260000-385	
		0.020	mg/L	SW846 7196A	01/25/00	0026385
		Analysis Time...: 23:16				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# METHOD BLANK REPORT

## DISSOLVED Metals

Client Lot #...: E0A250216

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
<b>MB Lot-Sample #:</b> E0A280000-279 <b>Prep Batch #...</b> : 0028279						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D819W10E
		Analysis Time...: 20:54				
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D819W10F
		Analysis Time...: 20:54				
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D819W10G
		Analysis Time...: 20:54				

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A250216      Work Order #...: D8024102      Matrix.....: WATER  
 LCS Lot-Sample#: E0A270000-499  
 Prep Date.....: 01/26/00      Analysis Date...: 01/26/00  
 Prep Batch #...: 0027499      Analysis Time...: 21:35

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECOVERY</u>	<u>METHOD</u>
Benzene	10.0	9.82	ug/L	98	SW846 8260B
Chlorobenzene	10.0	9.61	ug/L	96	SW846 8260B
1,1-Dichloroethene	10.0	9.42	ug/L	94	SW846 8260B
Toluene	10.0	9.83	ug/L	98	SW846 8260B
Trichloroethene	10.0	9.48	ug/L	95	SW846 8260B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Bromofluorobenzene	105	(70 - 130)
1,2-Dichloroethane-d4	88	(60 - 140)
Toluene-d8	110	(70 - 130)

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

# LABORATORY CONTROL SAMPLE DATA REPORT

## General Chemistry

Client Lot #...: E0A250216

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.0500	0.0490	mg/L	98	SW846 7196A	01/25/00	0026385

Work Order #: D7WDA102 LCS Lot-Sample#: E0A260000-385  
Analysis Time..: 23:15

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #...: E0A250216

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: E0A280000-279 Prep Batch #...: 0028279							
Cadmium	0.0500	0.0506	mg/L	101	SW846 6010B	01/31-02/01/00	D819W10H
Analysis Time...: 21:00							
Chromium	0.200	0.206	mg/L	103	SW846 6010B	01/31-02/01/00	D819W10J
Analysis Time...: 21:00							
Copper	0.250	0.254	mg/L	102	SW846 6010B	01/31-02/01/00	D819W10K
Analysis Time...: 21:00							

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A250216      Work Order #...: D7TEK108-MS      Matrix.....: WATER  
 MS Lot-Sample #: E0A250160-001      D7TEK109-MSD  
 Date Sampled...: 01/25/00 07:20      Date Received...: 01/25/00 09:00      MS Run #.....: 0027185  
 Prep Date.....: 01/26/00      Analysis Date...: 01/27/00  
 Prep Batch #...: 0027499      Analysis Time...: 05:42

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Benzene	ND	10.0	10.6	ug/L	106		SW846 8260B
	ND	10.0	9.79	ug/L	98	7.8	SW846 8260B
Chlorobenzene	ND	10.0	9.79	ug/L	98		SW846 8260B
	ND	10.0	9.58	ug/L	96	2.2	SW846 8260B
1,1-Dichloroethene	ND	10.0	10.3	ug/L	103		SW846 8260B
	ND	10.0	9.71	ug/L	97	6.2	SW846 8260B
Toluene	ND	10.0	10.4	ug/L	104		SW846 8260B
	ND	10.0	10.9	ug/L	109	4.7	SW846 8260B
Trichloroethene	ND	10.0	9.66	ug/L	97		SW846 8260B
	ND	10.0	9.07	ug/L	91	6.3	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	110	(70 - 130)
	108	(70 - 130)
1,2-Dichloroethane-d4	97	(60 - 140)
	94	(60 - 140)
Toluene-d8	116	(70 - 130)
	121	(70 - 130)

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

# MATRIX SPIKE SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #...: E0A250216

Matrix.....: WATER

Date Sampled...: 01/24/00 15:30 Date Received...: 01/27/00 10:00

PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
-----------	--------	-----	--------	-------	------------------	-----	--------	-------------------------------	-----------------

MS Lot-Sample #: E0A270140-002 Prep Batch #...: 0028279

Copper

0.250			mg/L	112			SW846 6010B	01/31-02/01/00	D7X1V120
0.250	0.264		mg/L	106	5.7		SW846 6010B	01/31-02/01/00	D7X1V121

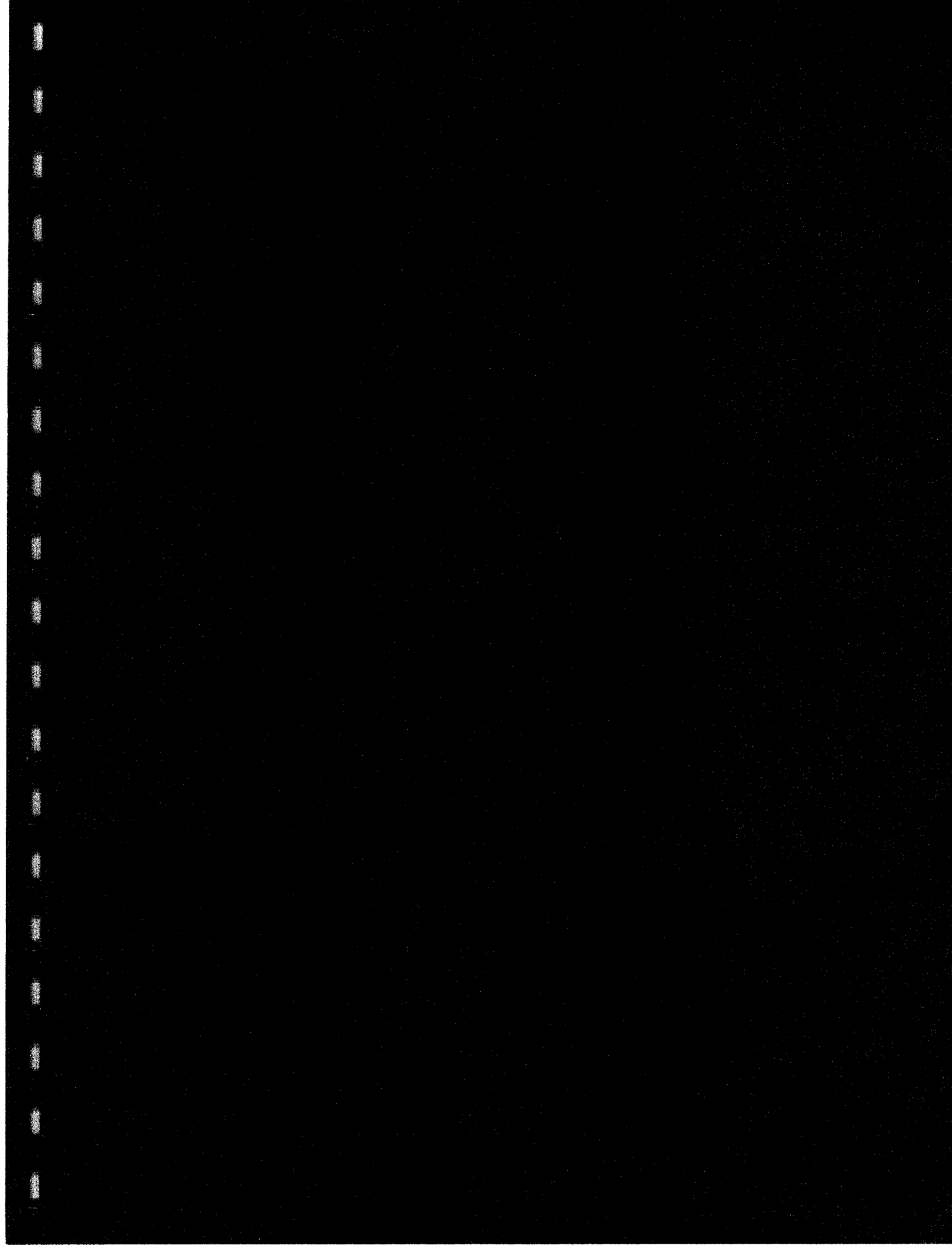
Analysis Time...: 21:23

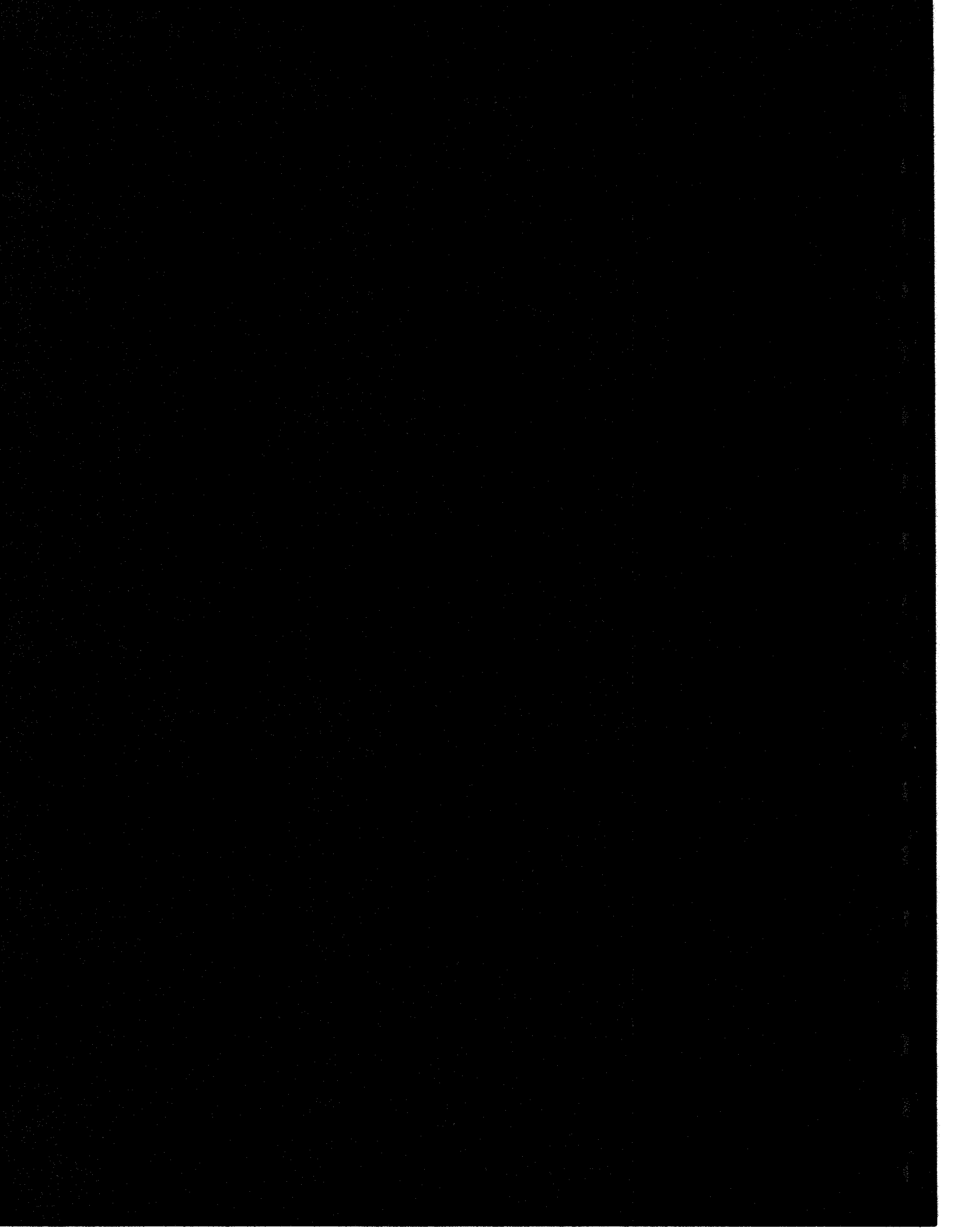
MS Run #.....: 0028161

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.









Quanterra  
1721 South Grand Ave.  
Santa Ana, CA 92705

Tel (714) 258-8610  
Fax (714) 258-0921

February 4, 2000

QUANTERRA INCORPORATED LOT NUMBER: **E0A260231**  
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin  
Camp, Dresser, McKee  
18881 Von Karman, Suite 650  
Irvine, CA 92612

Dear Ms. Wallin,

This report contains the analytical results for the nine samples received under chain of custody by Quanterra Incorporated on January 26, 2000. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

David Kammerer  
Project Manager

cc: Project File



Date: 1/26/00

Quote #: ~~2895~~ 29757

Project: PTF

Date/Time Received: 1/24 18:10

☐ DHL ☐ Ultra-Ex ☐ Rev B.

DES (2074)

Initial / Date

(12) 1/26

☒ No Seal # .....

6. i

(CORRECTED TEMP).....

☒ IR (Infra-red)

☐ Digital (Probe) .....

☒ Intact☐ Broken      ☐ Other .....☒ No☐ Yes (See Clouseau) .....

Labeling checked by .....

---

Short-Hold Notification: ☐Ph ☒Wet Chem ☐Metals (Filter/Pres) ☐Encore ☐N/A ...

Outside Analysis(es) (Test/Lab/Date Sent Out) :

n/A

\*\*\*\*\* LEAVE NO BLANK SPACES ; USE N/A \*\*\*\*\*

h:HCl	s:H2SO4	na:Sodium Hydroxide	znna: Sodium Hydroxide + Zinc Acetate	n:HNO3	n/f:HNO3 field filtered
* Number VOA's w/ air bubbles present					n/f/l:HNO3 Lab filtered

REVIEWED BY/DATE: \_\_\_\_\_

# DEPENDABLE EXPRESS SERVICE, INC.

17064 Pepper Brook Way No 127871  
Hacienda Heights, CA 91745  
(626) 913-2273

Reg. ☐  
Rush ☐  
Exp. ☒

MESSENGER Casey		24 HOUR SERVICE		DATE 1/26/00	
CHARGE TO: QUANTERRA					
ADDRESS 1721 SOUTH GRAND				SUITE # 340	
AUTHORIZED BY REF 340					
PICK UP FROM: QUANTERRA					
STREET AND NUMBER 1721 SOUTH GRAND				SUITE #	
CITY SANTA ANA				ZIP CODE	
DELIVER TO: PIT. BMO TECH					
STREET AND NUMBER 8851 Dice Road				SUITE #	
CITY SANTA FE SPRINGS				ZIP CODE 90670	
RETURN: <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
P/U TIME 2:30	DEL. TIME 4:30	COMMODITY Ice chest		FOR OFFICE USE ONLY	
WAITING TIME 20 MIN.	WEIGHT 10 LBS.	NO. PCS. 2	DEL. CHG.		
SPECIAL INSTRUCTIONS: AST w/ Grove Rob Lopez (949) 856-5606 CPM			RETURN		
			RUSH		
			EXP.		
			NIGHT OR HOLIDAY		
			WAITING TIME		
			EXTRA WEIGHT		
			SUB TOTAL		
			CASH ADVANCE		
			TOTAL		
RECEIVED BY (PLEASE SIGN LEGIBLY) X [Signature]					
RETURN RECEIVED BY (PLEASE SIGN LEGIBLY) X [Signature]					
X [Signature] 1/26/00 18:10					

Terms and Conditions Upon Which Pick-ups and Deliveries are made

Not responsible for loss or damage (A) Unless same is reported to us in writing within fifteen (15) days. Loss limited to \$100.00 per shipment unless a higher value is declared by customer on front of this ticket at time pick-up or delivery is authorized, in which case extra rates may be charged by us for insuring the excess value. Losses adjusted on basis of invoice cost price less reasonable depreciation.

WHITE COPY

YELLOW COPY

PINK COPY

# DEPENDABLE EXPRESS SERVICE, INC.

17064 Pepper Brook Way  
Hacienda Heights, CA 91745

(626) 913-2273

No 127871

Reg. ☐  
Rush ☐  
Exp. ☒

MESSENGER		24 HOUR SERVICE		DATE	
CASE #				1/26/00	
CHARGE TO:					
QUANTERA					
ADDRESS				SUITE #	
1721 SOUTH GRAND				340	
AUTHORIZED BY			REF		
			340		
PICK UP FROM:					
QUANTERA					
STREET AND NUMBER				SUITE #	
1721 SOUTH GRAND					
CITY				ZIP CODE	
SANTA ANA					
DELIVER TO:					
P.H.B. TECH					
STREET AND NUMBER				SUITE #	
8851 DICE ROAD					
CITY		ZIP CODE		FOR OFFICE USE ONLY	
SANTA FE SPRINGS		90670			
RETURN: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
P/U TIME	DEL TIME	COMMODITY		RETURN	
2:30		Ice cream			
WAITING TIME	MIN.	WEIGHT	NO. PCS.	RUSH	
		10 LBS.	2		
SPECIAL INSTRUCTIONS:					
ASK W. I. GROVE Rob Lopez					
RECEIVED BY (PLEASE SIGN LEGIBLY)				DEL. / CHG.	
X					
RETURN RECEIVED BY (PLEASE SIGN LEGIBLY)				EXP.	
X					
				NIGHT OR HOLIDAY	
				WAITING TIME	
				EXTRA WEIGHT	
				SUB TOTAL	
				CASH ADVANCE	
				TOTAL	

## Terms and Conditions Upon Which Pick-ups and Deliveries are made

Not responsible for loss or damage (A) Unless same is reported to us in writing within fifteen (15) days. Loss limited to \$100.00 per shipment unless a higher value is declared by customer on front of this ticket at time pick-up or delivery is authorized, in which case extra rates may be charged by us for insuring the excess value. Losses adjusted on basis of invoice cost price less reasonable depreciation.

WHITE-OFFICE

YELLOW-DRIVER

PINK-CUSTOMER

DELIVERY TO PHIBIOTECH

1/26/00

# ANALYTICAL METHODS SUMMARY

E0A260231

PARAMETER	ANALYTICAL METHOD
pH Aqueous	SW846 9040B
Hexavalent Chromium	SW846 7196A
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Volatile Organics by GC/MS	SW846 8260B

## References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# SAMPLE SUMMARY

E0A260231

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
D7WDF	001	PTI-MW7-046	01/25/00	16:30
D7WDG	002	PTI-DI-046	01/25/00	14:50
D7WDH	003	PTI-MW6D-046	01/25/00	15:10
D7WDJ	004	PTI-MW6B-046	01/25/00	14:00
D7WDK	005	PTI-MW11-046	01/25/00	11:55
D7WDL	006	PTI-TB2-046	01/25/00	
D7WDM	007	PTI-MW03-046	01/25/00	10:40
D7WDN	008	PTI-MW1S-046	01/25/00	08:00
D7WDP	009	PTI-EB01-046	01/25/00	17:00

## NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: PTI-MW7-046

Lot-Sample #....	E0A260231-001	Work Order #....	D7WDF101	Matrix.....	WATER
Date Sampled....	01/25/00 16:30	Date Received...	01/26/00 18:10	MS Run #.....	0027215
Prep Date.....	01/27/00	Analysis Date...	01/27/00		
Prep Batch #....	0027505	Analysis Time...	15:44		
		Method.....	SW846 8260B		

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	100	(70 - 130)
1,2-Dichloroethane-d4	94	(60 - 140)
Toluene-d8	105	(70 - 130)

PHIBRO-TECH, INC.

Client Sample ID: PTI-DI-046

GC/MS Volatiles

Lot-Sample #...: E0A260231-002 Work Order #...: D7WDG101 Matrix.....: WATER  
 Date Sampled...: 01/25/00 14:50 Date Received...: 01/26/00 18:10 MS Run #.....: 0027215  
 Prep Date.....: 01/27/00 Analysis Date...: 01/27/00  
 Prep Batch #...: 0027505 Analysis Time...: 16:14  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
Trichloroethene	ND	1.0	ug/L	0.20
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	105	(70 - 130)
1,2-Dichloroethane-d4	93	(60 - 140)
Toluene-d8	108	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6D-046

## GC/MS Volatiles

Lot-Sample #....: E0A260231-003    Work Order #....: D7WDH101    Matrix.....: WATER  
 Date Sampled....: 01/25/00 15:10    Date Received...: 01/26/00 18:10    MS Run #.....: 0027215  
 Prep Date.....: 01/27/00    Analysis Date...: 01/27/00  
 Prep Batch #....: 0027505    Analysis Time...: 16:45  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
<b>Ethylbenzene</b>	<b>1.8</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
<b>Tetrachloroethene</b>	<b>16</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
<b>Trichloroethene</b>	<b>9.2</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	106	(70 - 130)
1,2-Dichloroethane-d4	93	(60 - 140)
Toluene-d8	105	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6B-046

## GC/MS Volatiles

Lot-Sample #...: E0A260231-004    Work Order #...: D7WDJ101    Matrix.....: WATER  
 Date Sampled...: 01/25/00 14:00    Date Received...: 01/26/00 18:10    MS Run #.....: 0027215  
 Prep Date.....: 01/27/00    Analysis Date...: 01/27/00  
 Prep Batch #...: 0027505    Analysis Time...: 17:15  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
<b>1,1-Dichloroethane</b>	<b>2.0</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
1,2-Dichloroethane	ND	1.0	ug/L	0.20
<b>1,1-Dichloroethene</b>	<b>2.4</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
<b>Ethylbenzene</b>	<b>2.0</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
<b>Tetrachloroethene</b>	<b>17</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
<b>Trichloroethene</b>	<b>13</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	105	(70 - 130)
1,2-Dichloroethane-d4	96	(60 - 140)
Toluene-d8	105	(70 - 130)

Client Sample ID: PTI-MW11-046

Lot-Sample #....	E0A260231-005	Work Order #....	D7WDK101	Matrix.....	WATER
Date Sampled....	01/25/00 11:55	Date Received...	01/26/00 18:10	MS Run #.....	0027215
Prep Date.....	01/27/00	Analysis Date...	01/27/00		
Prep Batch #....	0027505	Analysis Time...	17:46		
		Method.....	SW846 8260B		

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	12	ug/L	3.8
Bromodichloromethane	ND	12	ug/L	2.5
Bromoform	ND	12	ug/L	3.8
Bromomethane	ND	25	ug/L	6.2
Carbon tetrachloride	ND	12	ug/L	3.8
Chlorobenzene	ND	12	ug/L	3.8
Dibromochloromethane	ND	12	ug/L	2.5
Chloroethane	ND	25	ug/L	3.8
<b>Chloroform</b>	<b>29</b>	<b>12</b>	<b>ug/L</b>	<b>2.5</b>
Chloromethane	ND	25	ug/L	3.8
1,2-Dichlorobenzene	ND	12	ug/L	2.5
1,3-Dichlorobenzene	ND	12	ug/L	2.5
1,4-Dichlorobenzene	ND	12	ug/L	3.8
<b>1,1-Dichloroethane</b>	<b>230</b>	<b>12</b>	<b>ug/L</b>	<b>2.5</b>
<b>1,2-Dichloroethane</b>	<b>22</b>	<b>12</b>	<b>ug/L</b>	<b>2.5</b>
<b>1,1-Dichloroethene</b>	<b>100</b>	<b>12</b>	<b>ug/L</b>	<b>2.5</b>
<b>cis-1,2-Dichloroethene</b>	<b>50</b>	<b>12</b>	<b>ug/L</b>	<b>3.8</b>
trans-1,2-Dichloroethene	ND	12	ug/L	2.5
1,2-Dichloropropane	ND	12	ug/L	2.5
cis-1,3-Dichloropropene	ND	12	ug/L	2.5
trans-1,3-Dichloropropene	ND	12	ug/L	6.2
Ethylbenzene	ND	12	ug/L	2.5
Methylene chloride	ND	12	ug/L	2.5
1,1,2,2-Tetrachloroethane	ND	12	ug/L	3.8
<b>Tetrachloroethene</b>	<b>22</b>	<b>12</b>	<b>ug/L</b>	<b>2.5</b>
Toluene	ND	12	ug/L	2.5
1,1,1-Trichloroethane	ND	12	ug/L	2.5
1,1,2-Trichloroethane	ND	12	ug/L	2.5
<b>Trichloroethene</b>	<b>820</b>	<b>12</b>	<b>ug/L</b>	<b>2.5</b>
Trichlorofluoromethane	ND	25	ug/L	2.5
Vinyl chloride	ND	25	ug/L	3.8
m-Xylene & p-Xylene	ND	12	ug/L	6.2
o-Xylene	ND	12	ug/L	2.5

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	103	(70 - 130)
1,2-Dichloroethane-d4	96	(60 - 140)
Toluene-d8	110	(70 - 130)



## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW03-046

## GC/MS Volatiles

Lot-Sample #....: E0A260231-007    Work Order #....: D7WDM101    Matrix.....: WATER  
 Date Sampled....: 01/25/00 10:40    Date Received...: 01/26/00 18:10    MS Run #.....: 0027215  
 Prep Date.....: 01/27/00    Analysis Date...: 01/27/00  
 Prep Batch #....: 0027505    Analysis Time...: 18:16  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	2.5	ug/L	0.75
Bromodichloromethane	ND	2.5	ug/L	0.50
Bromoform	ND	2.5	ug/L	0.75
Bromomethane	ND	5.0	ug/L	1.2
<b>Carbon tetrachloride</b>	<b>40</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.75</b>
Chlorobenzene	ND	2.5	ug/L	0.75
Dibromochloromethane	ND	2.5	ug/L	0.50
Chloroethane	ND	5.0	ug/L	0.75
<b>Chloroform</b>	<b>27</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Chloromethane	ND	5.0	ug/L	0.75
1,2-Dichlorobenzene	ND	2.5	ug/L	0.50
1,3-Dichlorobenzene	ND	2.5	ug/L	0.50
1,4-Dichlorobenzene	ND	2.5	ug/L	0.75
<b>1,1-Dichloroethane</b>	<b>18</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
1,2-Dichloroethane	ND	2.5	ug/L	0.50
<b>1,1-Dichloroethene</b>	<b>30</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>cis-1,2-Dichloroethene</b>	<b>8.0</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.75</b>
trans-1,2-Dichloroethene	ND	2.5	ug/L	0.50
1,2-Dichloropropane	ND	2.5	ug/L	0.50
cis-1,3-Dichloropropene	ND	2.5	ug/L	0.50
trans-1,3-Dichloropropene	ND	2.5	ug/L	1.2
<b>Ethylbenzene</b>	<b>54</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Methylene chloride	ND	2.5	ug/L	0.50
1,1,2,2-Tetrachloroethane	ND	2.5	ug/L	0.75
<b>Tetrachloroethene</b>	<b>19</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Toluene	ND	2.5	ug/L	0.50
1,1,1-Trichloroethane	ND	2.5	ug/L	0.50
1,1,2-Trichloroethane	ND	2.5	ug/L	0.50
<b>Trichloroethene</b>	<b>170</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Trichlorofluoromethane	ND	5.0	ug/L	0.50
Vinyl chloride	ND	5.0	ug/L	0.75
<b>m-Xylene &amp; p-Xylene</b>	<b>44</b>	<b>2.5</b>	<b>ug/L</b>	<b>1.2</b>
<b>o-Xylene</b>	<b>26</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	111	(70 - 130)
1,2-Dichloroethane-d4	104	(60 - 140)
Toluene-d8	107	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-EB01-046

## GC/MS Volatiles

Lot-Sample #....: E0A260231-009    Work Order #....: D7WDP101    Matrix.....: WATER  
 Date Sampled....: 01/25/00 17:00    Date Received...: 01/26/00 18:10    MS Run #.....: 0027215  
 Prep Date.....: 01/27/00    Analysis Date...: 01/27/00  
 Prep Batch #....: 0027505    Analysis Time...: 11:39  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
Trichloroethene	ND	1.0	ug/L	0.20
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	104	(70 - 130)
1,2-Dichloroethane-d4	86	(60 - 140)
Toluene-d8	110	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1S-046

## GC/MS Volatiles

Lot-Sample #....: E0A260231-008    Work Order #....: D7WDN101    Matrix.....: WATER  
 Date Sampled....: 01/25/00 08:00    Date Received...: 01/26/00 18:10    MS Run #.....: 0027215  
 Prep Date.....: 01/27/00    Analysis Date...: 01/27/00  
 Prep Batch #....: 0027505    Analysis Time...: 18:47  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	1.9	1.0	ug/L	0.20
1,2-Dichloroethane	1.5	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	2.8	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	31	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
Trichloroethene	9.9	1.0	ug/L	0.20
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	104	(70 - 130)
1,2-Dichloroethane-d4	95	(60 - 140)
Toluene-d8	105	(70 - 130)

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW7-046

General Chemistry

Lot-Sample #...: E0A260231-001    Work Order #...: D7WDF    Matrix.....: WATER

Date Sampled...: 01/25/00 16:30    Date Received...: 01/26/00 18:10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.3	0.10	No Units	SW846 9040B	01/26/00	0027477
		Analysis Time...: 20:09		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
		Analysis Time...: 20:37		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-DI-046

General Chemistry

Lot-Sample #...: E0A260231-002    Work Order #...: D7WDG    Matrix.....: WATER  
Date Sampled...: 01/25/00 14:50    Date Received...: 01/26/00 18:10

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH	5.8	0.10	No Units	SW846 9040B	01/26/00	0027477
		Analysis Time...: 20:15		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
		Analysis Time...: 20:40		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6D-046

General Chemistry

Lot-Sample #...: E0A260231-003    Work Order #...: D7WDH    Matrix.....: WATER

Date Sampled...: 01/25/00 15:10    Date Received...: 01/26/00 18:10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.4	0.10	No Units	SW846 9040B	01/26/00	0027477
		Analysis Time...: 20:18		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
		Analysis Time...: 20:41		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6B-046

General Chemistry

Lot-Sample #...: E0A260231-004    Work Order #...: D7WDJ    Matrix.....: WATER  
 Date Sampled...: 01/25/00 14:00    Date Received...: 01/26/00 18:10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.4	0.10	No Units	SW846 9040B	01/26/00	0027477
			Analysis Time...: 20:22	MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
			Analysis Time...: 20:42	MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW11-046

General Chemistry

Lot-Sample #....: E0A260231-005    Work Order #....: D7WDK    Matrix.....: WATER

Date Sampled....: 01/25/00 11:55    Date Received...: 01/26/00 18:10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	6.9	0.10	No Units	SW846 9040B	01/26/00	0027477
			Analysis Time...: 20:25	MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
			Analysis Time...: 20:43	MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW03-046

General Chemistry

Lot-Sample #...: E0A260231-007    Work Order #...: D7WDM    Matrix.....: WATER  
Date Sampled...: 01/25/00 10:40    Date Received...: 01/26/00 18:10

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH	7.2	0.10	No Units	SW846 9040B	01/26/00	0027477
		Analysis Time...: 20:28		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
		Analysis Time...: 20:44		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1S-046

General Chemistry

Lot-Sample #...: E0A260231-008    Work Order #...: D7WDN    Matrix.....: WATER

Date Sampled...: 01/25/00 08:00    Date Received...: 01/26/00 18:10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.0	0.10	No Units	SW846 9040B	01/26/00	0027477
		Analysis Time...: 20:31		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
		Analysis Time...: 20:45		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-EB01-046

General Chemistry

Lot-Sample #...: E0A260231-009    Work Order #...: D7WDP    Matrix.....: WATER  
 Date Sampled...: 01/25/00 17:00    Date Received...: 01/26/00 18:10

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	6.5	0.10	No Units	SW846 9040B	01/26/00	0027477
			Analysis Time...: 20:34	MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/26/00	0027480
			Analysis Time...: 20:46	MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW7-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-001

Matrix.....: WATER

Date Sampled...: 01/25/00 16:30 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-01/31/00	D7WDF104
		Analysis Time...: 14:04		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-01/31/00	D7WDF105
		Analysis Time...: 14:04		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-01/31/00	D7WDF106
		Analysis Time...: 14:04		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-DI-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-002

Matrix.....: WATER

Date Sampled...: 01/25/00 14:50 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDG104
		Analysis Time...: 16:07		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDG105
		Analysis Time...: 16:07		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDG106
		Analysis Time...: 16:07		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6D-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-003

Matrix.....: WATER

Date Sampled...: 01/25/00 15:10 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDH104
		Analysis Time...: 16:11		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDH105
		Analysis Time...: 16:11		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDH106
		Analysis Time...: 16:11		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW6B-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-004

Matrix.....: WATER

Date Sampled...: 01/25/00 14:00 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDJ104
		Analysis Time...: 16:18		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDJ105
		Analysis Time...: 16:18		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDJ106
		Analysis Time...: 16:18		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW11-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-005

Matrix.....: WATER

Date Sampled...: 01/25/00 11:55 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDK104
		Analysis Time...: 16:25		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDK105
		Analysis Time...: 16:25		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDK106
		Analysis Time...: 16:25		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW03-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-007

Matrix.....: WATER

Date Sampled...: 01/25/00 10:40 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDM104
		Analysis Time...: 16:29		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDM105
		Analysis Time...: 16:29		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDM106
		Analysis Time...: 16:29		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW1S-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-008

Matrix.....: WATER

Date Sampled...: 01/25/00 08:00 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDN104
		Analysis Time...: 16:38		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDN105
		Analysis Time...: 16:38		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDN106
		Analysis Time...: 16:38		MS Run #.....: 0034149	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-EB01-046

DISSOLVED Metals

Lot-Sample #...: E0A260231-009

Matrix.....: WATER

Date Sampled...: 01/25/00 17:00 Date Received...: 01/26/00 18:10

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/99	D7WDP104
		Analysis Time...: 16:45		MS Run #.....: 0034149	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/99	D7WDP105
		Analysis Time...: 16:45		MS Run #.....: 0034149	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/99	D7WDP106
		Analysis Time...: 16:45		MS Run #.....: 0034149	MDL.....: 0.0040	

# QC DATA ASSOCIATION SUMMARY

E0A260231

## Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
002	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
003	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
004	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
005	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
006	WATER	SW846 8260B		0027505	0027215
007	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
008	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149
009	WATER	SW846 7196A		0027480	
	WATER	SW846 9040B		0027477	
	WATER	SW846 8260B		0027505	0027215
	WATER	SW846 6010B		0027316	0034149

# METHOD BLANK REPORT

## GC/MS Volatiles

Client Lot #...: E0A260231      Work Order #...: D803F101      Matrix.....: WATER  
 MB Lot-Sample #: E0A270000-505  
 Prep Date.....: 01/27/00      Analysis Time...: 10:27  
 Analysis Date...: 01/27/00      Prep Batch #...: 0027505

PARAMETER	RESULT	REPORTING			METHOD
		LIMIT	UNITS		
Benzene	ND	1.0	ug/L		SW846 8260B
Bromodichloromethane	ND	1.0	ug/L		SW846 8260B
Bromoform	ND	1.0	ug/L		SW846 8260B
Bromomethane	ND	2.0	ug/L		SW846 8260B
Carbon tetrachloride	ND	1.0	ug/L		SW846 8260B
Chlorobenzene	ND	1.0	ug/L		SW846 8260B
Dibromochloromethane	ND	1.0	ug/L		SW846 8260B
Chloroethane	ND	2.0	ug/L		SW846 8260B
Chloroform	ND	1.0	ug/L		SW846 8260B
Chloromethane	ND	2.0	ug/L		SW846 8260B
1,2-Dichlorobenzene	ND	1.0	ug/L		SW846 8260B
1,3-Dichlorobenzene	ND	1.0	ug/L		SW846 8260B
1,4-Dichlorobenzene	ND	1.0	ug/L		SW846 8260B
1,1-Dichloroethane	ND	1.0	ug/L		SW846 8260B
1,2-Dichloroethane	ND	1.0	ug/L		SW846 8260B
1,1-Dichloroethene	ND	1.0	ug/L		SW846 8260B
cis-1,2-Dichloroethene	ND	1.0	ug/L		SW846 8260B
trans-1,2-Dichloroethene	ND	1.0	ug/L		SW846 8260B
1,2-Dichloropropane	ND	1.0	ug/L		SW846 8260B
cis-1,3-Dichloropropene	ND	1.0	ug/L		SW846 8260B
trans-1,3-Dichloropropene	ND	1.0	ug/L		SW846 8260B
Ethylbenzene	ND	1.0	ug/L		SW846 8260B
Methylene chloride	ND	1.0	ug/L		SW846 8260B
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L		SW846 8260B
Tetrachloroethene	ND	1.0	ug/L		SW846 8260B
Toluene	ND	1.0	ug/L		SW846 8260B
1,1,1-Trichloroethane	ND	1.0	ug/L		SW846 8260B
1,1,2-Trichloroethane	ND	1.0	ug/L		SW846 8260B
Trichloroethene	ND	1.0	ug/L		SW846 8260B
Trichlorofluoromethane	ND	2.0	ug/L		SW846 8260B
Vinyl chloride	ND	2.0	ug/L		SW846 8260B
m-Xylene & p-Xylene	ND	1.0	ug/L		SW846 8260B
o-Xylene	ND	1.0	ug/L		SW846 8260B

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	109	(70 - 130)
1,2-Dichloroethane-d4	92	(60 - 140)
Toluene-d8	114	(70 - 130)

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: E0A260231

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Hexavalent Chromium	ND	Work Order #: D7XXJ101		MB Lot-Sample #:	E0A270000-480	
		0.020	mg/L	SW846 7196A	01/26/00	0027480
		Analysis Time...: 20:48				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# METHOD BLANK REPORT

## DISSOLVED Metals

Client Lot #...: E0A260231

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
<b>MB Lot-Sample #:</b> E0A270000-316 <b>Prep Batch #...</b> : 0027316						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/27-02/01/00	D7X4P10D
		Analysis Time...: 19:54				
Chromium	ND	0.010	mg/L	SW846 6010B	01/27-02/01/00	D7X4P10E
		Analysis Time...: 19:54				
Copper	ND	0.025	mg/L	SW846 6010B	01/27-02/01/00	D7X4P10F
		Analysis Time...: 19:54				

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A260231      Work Order #...: D803F102      Matrix.....: WATER  
 LCS Lot-Sample#: E0A270000-505  
 Prep Date.....: 01/27/00      Analysis Date...: 01/27/00  
 Prep Batch #...: 0027505      Analysis Time...: 09:57

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
Benzene	10.0	10.2	ug/L	102	SW846 8260B
Chlorobenzene	10.0	9.91	ug/L	99	SW846 8260B
1,1-Dichloroethene	10.0	10.6	ug/L	106	SW846 8260B
Toluene	10.0	10.2	ug/L	102	SW846 8260B
Trichloroethene	10.0	9.33	ug/L	93	SW846 8260B

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Bromofluorobenzene	109	(70 - 130)
1,2-Dichloroethane-d4	92	(60 - 140)
Toluene-d8	110	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

# LABORATORY CONTROL SAMPLE DATA REPORT

## General Chemistry

Client Lot #...: E0A260231

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	9.18	8.83	No Units	96	SW846 9040B	01/26/00	0027477
Work Order #: D802F101 LCS Lot-Sample#: E0A270000-477							
Analysis Time...: 20:06							
Hexavalent Chromium	0.0500	0.0496	mg/L	99	SW846 7196A	01/26/00	0027480
Work Order #: D7XXJ102 LCS Lot-Sample#: E0A270000-480							
Analysis Time...: 20:47							

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #...: E0A260231

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: E0A270000-316 Prep Batch #...: 0027316							
Cadmium	0.0500	0.0509	mg/L	102	SW846 6010B	01/27-02/01/00	D7X4P10G
Analysis Time...: 20:00							
Chromium	0.200	0.209	mg/L	104	SW846 6010B	01/27-02/01/00	D7X4P10H
Analysis Time...: 20:00							
Copper	0.250	0.249	mg/L	100	SW846 6010B	01/27-02/01/00	D7X4P10J
Analysis Time...: 20:00							

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# MATRIX SPIKE SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #...: E0A260231

Matrix.....: WATER

Date Sampled...: 01/25/00 07:45 Date Received...: 01/25/00 14:10

PARAMETER	AMOUNT	AMT	AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
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MS Lot-Sample #: E0A250203-001 Prep Batch #...: 0027316

Cadmium

ND	0.050	0.0503	mg/L	97			SW846 6010B	01/27-02/01/00	D7TW610H
ND	0.050	0.0523	mg/L	101	4.0		SW846 6010B	01/27-02/01/00	D7TW610J

Analysis Time...: 20:20

MS Run #.....: 0034149

Chromium

ND	0.200	0.207	mg/L	99			SW846 6010B	01/27-02/01/00	D7TW610L
ND	0.200	0.217	mg/L	104	4.9		SW846 6010B	01/27-02/01/00	D7TW610M

Analysis Time...: 20:20

MS Run #.....: 0034149

Copper

0.041	0.250	0.281	mg/L	96			SW846 6010B	01/27-02/01/00	D7TW610I
0.041	0.250	0.295	mg/L	102	5.0		SW846 6010B	01/27-02/01/00	D7TW610Q

Analysis Time...: 20:20

MS Run #.....: 0034149

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #....: E0A260231      Work Order #....: D7V5E102-MS      Matrix.....: WATER  
 MS Lot-Sample #: E0A250221-002      D7V5E103-MSD  
 Date Sampled....: 01/25/00 11:18      Date Received...: 01/25/00 19:25      MS Run #.....: 0027215  
 Prep Date.....: 01/27/00      Analysis Date...: 01/27/00  
 Prep Batch #....: 0027505      Analysis Time...: 19:17

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Benzene	ND	10.0	10.9	ug/L	104		SW846 8260B
	ND	10.0	10.7	ug/L	102	1.8	SW846 8260B
Chlorobenzene	ND	10.0	9.76	ug/L	98		SW846 8260B
	ND	10.0	9.60	ug/L	96	1.6	SW846 8260B
1,1-Dichloroethene	ND	10.0	10.3	ug/L	103		SW846 8260B
	ND	10.0	9.99	ug/L	100	2.9	SW846 8260B
Toluene	ND	10.0	10.3	ug/L	103		SW846 8260B
	ND	10.0	10.2	ug/L	102	1.5	SW846 8260B
Trichloroethene	3.7	10.0	13.4	ug/L	97		SW846 8260B
	3.7	10.0	13.5	ug/L	98	0.66	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	104	(70 - 130)
	106	(70 - 130)
1,2-Dichloroethane-d4	101	(60 - 140)
	101	(60 - 140)
Toluene-d8	112	(70 - 130)
	110	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters







*Precis*  
A Quanterra Product

Quanterra  
1721 South Grand Ave.  
Santa Ana, CA 92705

Tel (714) 258-8610  
Fax (714) 258-0921

February 3, 2000

QUANTERRA INCORPORATED LOT NUMBER: **E0A270246**  
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin  
Camp, Dresser, McKee  
18881 Von Karman, Suite 650  
Irvine, CA 92612

Dear Ms. Wallin,

This report contains the analytical results for the five samples received under chain of custody by Quanterra Incorporated on January 27, 2000. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,



David Kammerer  
Project Manager

cc: Project File





# DEPENDABLE EXPRESS SERVICE, INC.

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Hacienda Heights, CA 91745

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Reg. ☐  
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MESSANGER <b>Robert</b>	24 HOUR SERVICE	DATE <b>1-27-00</b>
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CHARGE TO:

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ADDRESS

**1721 S. Grand Ave.**

SUITE #

AUTHORIZED BY

REF

**340**

PICK UP FROM:

**Phibro Tech.**

STREET AND NUMBER

**8851 Dine Rd.**

SUITE #

CITY

**Santa Fe Springs**

ZIP CODE

**90670**

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**Quanterra**

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SUITE #

CITY

**Santa Ana**

ZIP CODE

FOR OFFICE USE ONLY

RETURN ☐ YES ☐ NO

P/U TIME

**1611**

DEL TIME

**1734**

COMMODITY

**Ice Chest**

WAITING TIME

MIN.

WEIGHT

**15**

LBS.

NO. PCS

**1**

SPECIAL INSTRUCTIONS:

RETURN

RUSH

EXP.

NIGHT OR HOLIDAY

WAITING TIME

EXTRA WEIGHT

SUB TOTAL

CASH ADVANCE

TOTAL

RECEIVED BY (PLEASE SIGN LEGIBLY)

**X**

RETURN RECEIVED BY (PLEASE SIGN LEGIBLY)

**X**

**(Signature) 1/27/00**

**17.34**

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PINK-CUSTOMER

# ANALYTICAL METHODS SUMMARY

E0A270246

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>
pH Aqueous	SW846 9040B
Hexavalent Chromium	SW846 7196A
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Volatile Organics by GC/MS	SW846 8260B

## References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

E0A270246

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
D800P	001	PTI-TB3-046	01/27/00	
D800W	002	PTI-MW4-046	01/27/00	12:15
D8012	003	PTI-MW14S-046	01/27/00	15:35
D8014	004	PTI-MW35-046	01/27/00	10:05
D8016	005	PTI-MW4A-046	01/27/00	14:20

### NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.



PHIBRO-TECH, INC.

Client Sample ID: PTI-MW4-046

GC/MS Volatiles

Lot-Sample #...: E0A270246-002 Work Order #...: D800W101 Matrix.....: WATER  
 Date Sampled...: 01/27/00 12:15 Date Received...: 01/27/00 17:34 MS Run #.....: 0028206  
 Prep Date.....: 01/28/00 Analysis Date...: 01/28/00  
 Prep Batch #...: 0028437 Analysis Time...: 12:31  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
<b>Benzene</b>	<b>5.1</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.75</b>
Bromodichloromethane	ND	2.5	ug/L	0.50
Bromoform	ND	2.5	ug/L	0.75
Bromomethane	ND	5.0	ug/L	1.2
Carbon tetrachloride	ND	2.5	ug/L	0.75
Chlorobenzene	ND	2.5	ug/L	0.75
Dibromochloromethane	ND	2.5	ug/L	0.50
Chloroethane	ND	5.0	ug/L	0.75
<b>Chloroform</b>	<b>18</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Chloromethane	ND	5.0	ug/L	0.75
1,2-Dichlorobenzene	ND	2.5	ug/L	0.50
1,3-Dichlorobenzene	ND	2.5	ug/L	0.50
1,4-Dichlorobenzene	ND	2.5	ug/L	0.75
<b>1,1-Dichloroethane</b>	<b>160</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>1,2-Dichloroethane</b>	<b>18</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>1,1-Dichloroethene</b>	<b>85</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>cis-1,2-Dichloroethene</b>	<b>170</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.75</b>
<b>trans-1,2-Dichloroethene</b>	<b>4.9</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
1,2-Dichloropropane	ND	2.5	ug/L	0.50
cis-1,3-Dichloropropene	ND	2.5	ug/L	0.50
trans-1,3-Dichloropropene	ND	2.5	ug/L	1.2
Ethylbenzene	ND	2.5	ug/L	0.50
<b>Methylene chloride</b>	<b>100</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
1,1,2,2-Tetrachloroethane	ND	2.5	ug/L	0.75
<b>Tetrachloroethene</b>	<b>8.8</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Toluene	ND	2.5	ug/L	0.50
1,1,1-Trichloroethane	ND	2.5	ug/L	0.50
1,1,2-Trichloroethane	ND	2.5	ug/L	0.50
<b>Trichloroethene</b>	<b>160</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Trichlorofluoromethane	ND	5.0	ug/L	0.50
Vinyl chloride	ND	5.0	ug/L	0.75
<b>m-Xylene &amp; p-Xylene</b>	<b>6.0</b>	<b>2.5</b>	<b>ug/L</b>	<b>1.2</b>
o-Xylene	ND	2.5	ug/L	0.50

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	99	(70 - 130)
1,2-Dichloroethane-d4	96	(60 - 140)
Toluene-d8	100	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW14S-046

## GC/MS Volatiles

Lot-Sample #....: E0A270246-003    Work Order #....: D8012101    Matrix.....: WATER  
 Date Sampled....: 01/27/00 15:35    Date Received...: 01/27/00 17:34    MS Run #.....: 0028206  
 Prep Date.....: 01/28/00    Analysis Date...: 01/28/00  
 Prep Batch #....: 0028437    Analysis Time...: 13:02  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	5.0	ug/L	1.5
Bromodichloromethane	ND	5.0	ug/L	1.0
Bromoform	ND	5.0	ug/L	1.5
Bromomethane	ND	10	ug/L	2.5
<b>Carbon tetrachloride</b>	<b>35</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.5</b>
Chlorobenzene	ND	5.0	ug/L	1.5
Dibromochloromethane	ND	5.0	ug/L	1.0
Chloroethane	ND	10	ug/L	1.5
<b>Chloroform</b>	<b>29</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
Chloromethane	ND	10	ug/L	1.5
1,2-Dichlorobenzene	ND	5.0	ug/L	1.0
1,3-Dichlorobenzene	ND	5.0	ug/L	1.0
1,4-Dichlorobenzene	ND	5.0	ug/L	1.5
<b>1,1-Dichloroethane</b>	<b>81</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>1,2-Dichloroethane</b>	<b>31</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>1,1-Dichloroethene</b>	<b>69</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>cis-1,2-Dichloroethene</b>	<b>14</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.5</b>
trans-1,2-Dichloroethene	ND	5.0	ug/L	1.0
1,2-Dichloropropane	ND	5.0	ug/L	1.0
cis-1,3-Dichloropropene	ND	5.0	ug/L	1.0
trans-1,3-Dichloropropene	ND	5.0	ug/L	2.5
Ethylbenzene	ND	5.0	ug/L	1.0
<b>Methylene chloride</b>	<b>5.7</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
1,1,2,2-Tetrachloroethane	ND	5.0	ug/L	1.5
Tetrachloroethene	ND	5.0	ug/L	1.0
Toluene	ND	5.0	ug/L	1.0
1,1,1-Trichloroethane	ND	5.0	ug/L	1.0
1,1,2-Trichloroethane	ND	5.0	ug/L	1.0
<b>Trichloroethene</b>	<b>230</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
Trichlorofluoromethane	ND	10	ug/L	1.0
Vinyl chloride	ND	10	ug/L	1.5
m-Xylene & p-Xylene	ND	5.0	ug/L	2.5
o-Xylene	ND	5.0	ug/L	1.0

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	95	(70 - 130)
1,2-Dichloroethane-d4	93	(60 - 140)
Toluene-d8	102	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW35-046

## GC/MS Volatiles

Lot-Sample #...: E0A270246-004    Work Order #...: D8014101    Matrix.....: WATER  
 Date Sampled...: 01/27/00 10:05    Date Received...: 01/27/00 17:34    MS Run #.....: 0028206  
 Prep Date.....: 01/28/00    Analysis Date...: 01/28/00  
 Prep Batch #...: 0028437    Analysis Time...: 13:33  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
<b>Benzene</b>	<b>5.0</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.75</b>
Bromodichloromethane	ND	2.5	ug/L	0.50
Bromoform	ND	2.5	ug/L	0.75
Bromomethane	ND	5.0	ug/L	1.2
Carbon tetrachloride	ND	2.5	ug/L	0.75
Chlorobenzene	ND	2.5	ug/L	0.75
Dibromochloromethane	ND	2.5	ug/L	0.50
Chloroethane	ND	5.0	ug/L	0.75
<b>Chloroform</b>	<b>18</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Chloromethane	ND	5.0	ug/L	0.75
1,2-Dichlorobenzene	ND	2.5	ug/L	0.50
1,3-Dichlorobenzene	ND	2.5	ug/L	0.50
1,4-Dichlorobenzene	ND	2.5	ug/L	0.75
<b>1,1-Dichloroethane</b>	<b>160</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>1,2-Dichloroethane</b>	<b>18</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>1,1-Dichloroethene</b>	<b>84</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
<b>cis-1,2-Dichloroethene</b>	<b>170</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.75</b>
<b>trans-1,2-Dichloroethene</b>	<b>4.7</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
1,2-Dichloropropane	ND	2.5	ug/L	0.50
cis-1,3-Dichloropropene	ND	2.5	ug/L	0.50
trans-1,3-Dichloropropene	ND	2.5	ug/L	1.2
Ethylbenzene	ND	2.5	ug/L	0.50
<b>Methylene chloride</b>	<b>100</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
1,1,2,2-Tetrachloroethane	ND	2.5	ug/L	0.75
<b>Tetrachloroethene</b>	<b>8.7</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Toluene	ND	2.5	ug/L	0.50
1,1,1-Trichloroethane	ND	2.5	ug/L	0.50
1,1,2-Trichloroethane	ND	2.5	ug/L	0.50
<b>Trichloroethene</b>	<b>160</b>	<b>2.5</b>	<b>ug/L</b>	<b>0.50</b>
Trichlorofluoromethane	ND	5.0	ug/L	0.50
Vinyl chloride	ND	5.0	ug/L	0.75
<b>m-Xylene &amp; p-Xylene</b>	<b>6.0</b>	<b>2.5</b>	<b>ug/L</b>	<b>1.2</b>
o-Xylene	ND	2.5	ug/L	0.50

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	96	(60 - 140)
Toluene-d8	100	(70 - 130)



PHIBRO-TECH, INC.

Client Sample ID: PTI-MW4-046

General Chemistry

Lot-Sample #...: E0A270246-002    Work Order #...: D800W    Matrix.....: WATER  
 Date Sampled...: 01/27/00 12:15    Date Received...: 01/27/00 17:34

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	6.7	0.10	No Units	SW846 9040B	01/27/00	0027502
		Analysis Time...: 19:20		MS Run #.....:	MDL.....:	
Hexavalent Chromium	76.3	20.0	mg/L	SW846 7196A	01/27/00	0027501
		Analysis Time...: 20:37		MS Run #.....:	MDL.....: 10.0	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW14S-046

General Chemistry

Lot-Sample #....: E0A270246-003    Work Order #....: D8012    Matrix.....: WATER  
 Date Sampled....: 01/27/00 15:35    Date Received...: 01/27/00 17:34

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.2	0.10	No Units	SW846 9040B	01/27/00	0027502
			Analysis Time...: 19:26	MS Run #.....:	MDL.....:	
Hexavalent Chromium	0.11	0.040	mg/L	SW846 7196A	01/27/00	0027501
			Analysis Time...: 20:38	MS Run #.....:	MDL.....: 0.020	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW35-046

General Chemistry

Lot-Sample #....: E0A270246-004    Work Order #....: D8014    Matrix.....: WATER  
 Date Sampled....: 01/27/00 10:05    Date Received...: 01/27/00 17:34

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	6.8	0.10	No Units	SW846 9040B	01/27/00	0027502
			Analysis Time...: 19:29	MS Run #.....:	MDL.....:	
Hexavalent Chromium	69.9	20.0	mg/L	SW846 7196A	01/27/00	0027501
			Analysis Time...: 20:39	MS Run #.....:	MDL.....: 10.0	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW14S-046

DISSOLVED Metals

Lot-Sample #...: E0A270246-003

Matrix.....: WATER

Date Sampled...: 01/27/00 15:35 Date Received...: 01/27/00 17:34

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0028279						
Cadmium	0.0094	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D8012104
		Analysis Time...: 17:06		MS Run #.....: 0028160	MDL.....: 0.00050	
Chromium	0.26	0.010	mg/L	SW846 6010B	01/31-02/01/00	D8012105
		Analysis Time...: 17:06		MS Run #.....: 0028160	MDL.....: 0.0010	
Copper	0.031	0.025	mg/L	SW846 6010B	01/31-02/01/00	D8012106
		Analysis Time...: 17:06		MS Run #.....: 0028160	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW35-046

DISSOLVED Metals

Lot-Sample #...: E0A270246-004

Matrix.....: WATER

Date Sampled...: 01/27/00 10:05 Date Received...: 01/27/00 17:34

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	0028279					
Cadmium	0.32	0.010	mg/L	SW846 6010B	01/31-02/01/00	D8014104
		Analysis Time...: 17:21		MS Run #.....: 0028160	MDL.....: 0.0010	
Chromium	58.5	0.020	mg/L	SW846 6010B	01/31-02/01/00	D8014105
		Analysis Time...: 17:21		MS Run #.....: 0028160	MDL.....: 0.0020	
Copper	ND	0.050	mg/L	SW846 6010B	01/31-02/01/00	D8014106
		Analysis Time...: 17:21		MS Run #.....: 0028160	MDL.....: 0.0080	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW4A-046

DISSOLVED Metals

Lot-Sample #...: E0A270246-005

Matrix.....: WATER

Date Sampled...: 01/27/00 14:20 Date Received...: 01/27/00 17:34

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0028279						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D8016104
		Analysis Time...: 17:26		MS Run #.....: 0028160	MDL.....: 0.00050	
Chromium	0.015	0.010	mg/L	SW846 6010B	01/31-02/01/00	D8016105
		Analysis Time...: 17:26		MS Run #.....: 0028160	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D8016106
		Analysis Time...: 17:26		MS Run #.....: 0028160	MDL.....: 0.0040	

# QC DATA ASSOCIATION SUMMARY

E0A270246

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	SW846 8260B		0028437	0028206
002	WATER	SW846 7196A		0027501	
	WATER	SW846 9040B		0027502	
	WATER	SW846 8260B		0028437	0028206
	WATER	SW846 6010B		0028279	0028160
003	WATER	SW846 7196A		0027501	
	WATER	SW846 9040B		0027502	
	WATER	SW846 8260B		0028437	0028206
	WATER	SW846 6010B		0028279	0028160
004	WATER	SW846 7196A		0027501	
	WATER	SW846 9040B		0027502	
	WATER	SW846 8260B		0028437	0028206
	WATER	SW846 6010B		0028279	0028160
005	WATER	SW846 7196A		0027501	
	WATER	SW846 9040B		0027502	
	WATER	SW846 8260B		0028437	0028206
	WATER	SW846 6010B		0028279	0028160

# METHOD BLANK REPORT

## GC/MS Volatiles

Client Lot #....: E0A270246  
MB Lot-Sample #: E0A280000-437

Work Order #....: D81KJ101

Matrix.....: WATER

Analysis Date...: 01/28/00

Prep Date.....: 01/28/00

Analysis Time...: 10:11

Prep Batch #....: 0028437

PARAMETER	RESULT	REPORTING			METHOD
		LIMIT	UNITS		
Benzene	ND	1.0	ug/L		SW846 8260B
Bromodichloromethane	ND	1.0	ug/L		SW846 8260B
Bromoform	ND	1.0	ug/L		SW846 8260B
Bromomethane	ND	2.0	ug/L		SW846 8260B
Carbon tetrachloride	ND	1.0	ug/L		SW846 8260B
Chlorobenzene	ND	1.0	ug/L		SW846 8260B
Dibromochloromethane	ND	1.0	ug/L		SW846 8260B
Chloroethane	ND	2.0	ug/L		SW846 8260B
Chloroform	ND	1.0	ug/L		SW846 8260B
Chloromethane	ND	2.0	ug/L		SW846 8260B
1,2-Dichlorobenzene	ND	1.0	ug/L		SW846 8260B
1,3-Dichlorobenzene	ND	1.0	ug/L		SW846 8260B
1,4-Dichlorobenzene	ND	1.0	ug/L		SW846 8260B
1,1-Dichloroethane	ND	1.0	ug/L		SW846 8260B
1,2-Dichloroethane	ND	1.0	ug/L		SW846 8260B
1,1-Dichloroethene	ND	1.0	ug/L		SW846 8260B
cis-1,2-Dichloroethene	ND	1.0	ug/L		SW846 8260B
trans-1,2-Dichloroethene	ND	1.0	ug/L		SW846 8260B
1,2-Dichloropropane	ND	1.0	ug/L		SW846 8260B
cis-1,3-Dichloropropene	ND	1.0	ug/L		SW846 8260B
trans-1,3-Dichloropropene	ND	1.0	ug/L		SW846 8260B
Ethylbenzene	ND	1.0	ug/L		SW846 8260B
Methylene chloride	ND	1.0	ug/L		SW846 8260B
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L		SW846 8260B
Tetrachloroethene	ND	1.0	ug/L		SW846 8260B
Toluene	ND	1.0	ug/L		SW846 8260B
1,1,1-Trichloroethane	ND	1.0	ug/L		SW846 8260B
1,1,2-Trichloroethane	ND	1.0	ug/L		SW846 8260B
Trichloroethene	ND	1.0	ug/L		SW846 8260B
Trichlorofluoromethane	ND	2.0	ug/L		SW846 8260B
Vinyl chloride	ND	2.0	ug/L		SW846 8260B
m-Xylene & p-Xylene	ND	1.0	ug/L		SW846 8260B
o-Xylene	ND	1.0	ug/L		SW846 8260B

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	92	(70 - 130)
1,2-Dichloroethane-d4	84	(60 - 140)
Toluene-d8	98	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: E0A270246

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Hexavalent Chromium	ND	Work Order #: D803D101		MB Lot-Sample #:	E0A270000-501	
		0.020	mg/L	SW846 7196A	01/27/00	0027501
		Analysis Time...: 20:44				

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

# METHOD BLANK REPORT

## DISSOLVED Metals

Client Lot #...: E0A270246

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: E0A280000-279 Prep Batch #...: 0028279						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D819W10E
		Analysis Time...: 20:54				
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D819W10F
		Analysis Time...: 20:54				
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D819W10G
		Analysis Time...: 20:54				

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A270246      Work Order #...: D81KJ102      Matrix.....: WATER  
 LCS Lot-Sample#: E0A280000-437  
 Prep Date.....: 01/28/00      Analysis Date...: 01/28/00  
 Prep Batch #...: 0028437      Analysis Time...: 09:40

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
Benzene	10.0	9.47	ug/L	95	SW846 8260B
Chlorobenzene	10.0	9.65	ug/L	96	SW846 8260B
1,1-Dichloroethene	10.0	9.74	ug/L	97	SW846 8260B
Toluene	10.0	9.59	ug/L	96	SW846 8260B
Trichloroethene	10.0	9.75	ug/L	98	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	99	(70 - 130)
1,2-Dichloroethane-d4	87	(60 - 140)
Toluene-d8	105	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Bold print denotes control parameters

# LABORATORY CONTROL SAMPLE DATA REPORT

## General Chemistry

Client Lot #...: E0A270246

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	9.18	8.78	No Units	96	SW846 9040B	01/27/00	0027502
Work Order #: D803E101 LCS Lot-Sample#: E0A270000-502							
Analysis Time...: 19:19							
Hexavalent Chromium	0.0500	0.0506	mg/L	101	SW846 7196A	01/27/00	0027501
Work Order #: D803D102 LCS Lot-Sample#: E0A270000-501							
Analysis Time...: 20:43							

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #...: E0A270246

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: E0A280000-279 Prep Batch #...: 0028279							
Cadmium	0.0500	0.0506	mg/L	101	SW846 6010B	01/31-02/01/00	D819W10H
Analysis Time...: 21:00							
Chromium	0.200	0.206	mg/L	103	SW846 6010B	01/31-02/01/00	D819W10J
Analysis Time...: 21:00							
Copper	0.250	0.254	mg/L	102	SW846 6010B	01/31-02/01/00	D819W10K
Analysis Time...: 21:00							

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A270246      Work Order #...: D801R102-MS      Matrix.....: WATER  
 MS Lot-Sample #: E0A270249-001      D801R103-MSD  
 Date Sampled...: 01/27/00 08:21      Date Received...: 01/27/00 20:00      MS Run #.....: 0028206  
 Prep Date.....: 01/28/00      Analysis Date...: 01/28/00  
 Prep Batch #...: 0028437      Analysis Time...: 15:05

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Benzene	ND	10.0	9.77	ug/L	98		SW846 8260B
	ND	10.0	9.55	ug/L	96	2.3	SW846 8260B
Chlorobenzene	ND	10.0	9.63	ug/L	96		SW846 8260B
	ND	10.0	9.64	ug/L	96	0.10	SW846 8260B
1,1-Dichloroethene	ND	10.0	9.69	ug/L	97		SW846 8260B
	ND	10.0	9.63	ug/L	96	0.62	SW846 8260B
Toluene	ND	10.0	9.35	ug/L	94		SW846 8260B
	ND	10.0	9.32	ug/L	93	0.32	SW846 8260B
Trichloroethene	ND	10.0	9.93	ug/L	99		SW846 8260B
	ND	10.0	9.62	ug/L	96	3.2	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	98	(70 - 130)
	99	(70 - 130)
1,2-Dichloroethane-d4	93	(60 - 140)
	93	(60 - 140)
Toluene-d8	99	(70 - 130)
	100	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters









Quanterra  
1721 South Grand Ave.  
Santa Ana, CA 92705

Tel (714) 258-8610  
Fax (714) 258-0921

February 3, 2000

QUANTERRA INCORPORATED LOT NUMBER: **E0A280244**  
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin  
Camp, Dresser, McKee  
18881 Von Karman, Suite 650  
Irvine, CA 92612

Dear Ms. Wallin,

This report contains the analytical results for the seven samples received under chain of custody by Quanterra Incorporated on January 28, 2000. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

David Kammerer  
Project Manager

cc: Project File



Date: 1/28/02

Quote #: 29752

Project: PT I

Date/Time Received: 1/28 1105

☐ DHL ☐ Ultra-Ex ☐ Rev B.

☐ DHL ☐ Ultra-Ex ☐ Rey B.

Initial / Date  
..... Pm 1/28

☒ No Seal # .....

☒ Quanterra ☐ Client ☐ N/A .....

C.S. N/A .....  
(CORRECTED TEMP).....

☒ IR (Infra-red)      ☐ Digital (Probe) .....☒ Intact      ☐ Broken      ☐ Other

☒ No ☐ Yes (See Clouseau) .....

\_\_\_\_\_

156

.....

on: ☐ Ph ☒ Wet Chem ☐ Metals (Filter/Pres) ☐ Encore ☐ N/A ...

(Test/Lab/Date Sent Out) :

.....

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N/A

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\*\*\*\*\* LEAVE NO BLANK SPACES ; USE N/A \*\*\*\*\*

[illegible]

h:HCl	s:H2SO4	na:Sodium Hydroxide	znna: Sodium Hydroxide + Zinc Acetate	n:HNO3	n/f:HNO3 field filtered
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\* Number VOA's w/ air bubbles present

n/f/l:HNO3 Lab filtered

LOGGED BY/DATE: (JAC) 1/28/00

REVIEWED BY/DATE: \_\_\_\_\_

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# ANALYTICAL METHODS SUMMARY

E0A280244

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>
pH Aqueous	SW846 9040B
Hexavalent Chromium	SW846 7196A
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Volatile Organics by GC/MS	SW846 8260B

## References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

## SAMPLE SUMMARY

E0A280244

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
D81AM	001	PTI-MW9-046	01/28/00	12:00
D81AQ	002	PTI-MW37-046	01/28/00	11:15
D81AT	003	PTI-MW16-046	01/28/00	10:45
D81AW	004	PTI-EB2-046	01/28/00	10:10
D81C0	005	PTI-MW15D-046	01/28/00	09:05
D81C4	006	PTI-MW15S-046	01/28/00	08:15
D81C9	007	PTI-TB4-046	01/28/00	

### NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Client Sample ID: PTI-MW9-046

```

Lot-Sample #....: E0A280244-001  Work Order #....: D81AM101          Matrix.....: WATER
Date Sampled....: 01/28/00 12:00  Date Received...: 01/28/00 15:05  MS Run #.....: 0031123
Prep Date.....: 01/28/00          Analysis Date...: 01/29/00
Prep Batch #....: 0031334          Analysis Time...: 00:26
                                   Method.....: SW846 8260B

```

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	5.0	ug/L	1.5
Bromodichloromethane	ND	5.0	ug/L	1.0
Bromoform	ND	5.0	ug/L	1.5
Bromomethane	ND	10	ug/L	2.5
Carbon tetrachloride	ND	5.0	ug/L	1.5
Chlorobenzene	ND	5.0	ug/L	1.5
Dibromochloromethane	ND	5.0	ug/L	1.0
Chloroethane	ND	10	ug/L	1.5
<b>Chloroform</b>	<b>150</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
Chloromethane	ND	10	ug/L	1.5
1,2-Dichlorobenzene	ND	5.0	ug/L	1.0
1,3-Dichlorobenzene	ND	5.0	ug/L	1.0
1,4-Dichlorobenzene	ND	5.0	ug/L	1.5
<b>1,1-Dichloroethane</b>	<b>170</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>1,2-Dichloroethane</b>	<b>38</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>1,1-Dichloroethene</b>	<b>52</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>cis-1,2-Dichloroethene</b>	<b>7.0</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.5</b>
trans-1,2-Dichloroethene	ND	5.0	ug/L	1.0
1,2-Dichloropropane	ND	5.0	ug/L	1.0
cis-1,3-Dichloropropene	ND	5.0	ug/L	1.0
trans-1,3-Dichloropropene	ND	5.0	ug/L	2.5
Ethylbenzene	ND	5.0	ug/L	1.0
<b>Methylene chloride</b>	<b>300</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
1,1,2,2-Tetrachloroethane	ND	5.0	ug/L	1.5
Tetrachloroethene	ND	5.0	ug/L	1.0
Toluene	ND	5.0	ug/L	1.0
1,1,1-Trichloroethane	ND	5.0	ug/L	1.0
1,1,2-Trichloroethane	ND	5.0	ug/L	1.0
<b>Trichloroethene</b>	<b>170</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
Trichlorofluoromethane	ND	10	ug/L	1.0
Vinyl chloride	ND	10	ug/L	1.5
m-Xylene & p-Xylene	ND	5.0	ug/L	2.5
o-Xylene	ND	5.0	ug/L	1.0

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	94	(60 - 140)
Toluene-d8	104	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW37-046

## GC/MS Volatiles

Lot-Sample #....: E0A280244-002    Work Order #....: D81AQ101    Matrix.....: WATER  
 Date Sampled....: 01/28/00 11:15    Date Received...: 01/28/00 15:05    MS Run #.....: 0031123  
 Prep Date.....: 01/28/00    Analysis Date...: 01/29/00  
 Prep Batch #....: 0031334    Analysis Time...: 00:56  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	5.0	ug/L	1.5
Bromodichloromethane	ND	5.0	ug/L	1.0
Bromoform	ND	5.0	ug/L	1.5
Bromomethane	ND	10	ug/L	2.5
Carbon tetrachloride	ND	5.0	ug/L	1.5
Chlorobenzene	ND	5.0	ug/L	1.5
Dibromochloromethane	ND	5.0	ug/L	1.0
Chloroethane	ND	10	ug/L	1.5
<b>Chloroform</b>	<b>110</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
Chloromethane	ND	10	ug/L	1.5
1,2-Dichlorobenzene	ND	5.0	ug/L	1.0
1,3-Dichlorobenzene	ND	5.0	ug/L	1.0
1,4-Dichlorobenzene	ND	5.0	ug/L	1.5
<b>1,1-Dichloroethane</b>	<b>130</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>1,2-Dichloroethane</b>	<b>31</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
<b>1,1-Dichloroethene</b>	<b>36</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
cis-1,2-Dichloroethene	ND	5.0	ug/L	1.5
trans-1,2-Dichloroethene	ND	5.0	ug/L	1.0
1,2-Dichloropropane	ND	5.0	ug/L	1.0
cis-1,3-Dichloropropene	ND	5.0	ug/L	1.0
trans-1,3-Dichloropropene	ND	5.0	ug/L	2.5
Ethylbenzene	ND	5.0	ug/L	1.0
<b>Methylene chloride</b>	<b>270</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
1,1,2,2-Tetrachloroethane	ND	5.0	ug/L	1.5
Tetrachloroethene	ND	5.0	ug/L	1.0
Toluene	ND	5.0	ug/L	1.0
1,1,1-Trichloroethane	ND	5.0	ug/L	1.0
1,1,2-Trichloroethane	ND	5.0	ug/L	1.0
<b>Trichloroethene</b>	<b>120</b>	<b>5.0</b>	<b>ug/L</b>	<b>1.0</b>
Trichlorofluoromethane	ND	10	ug/L	1.0
Vinyl chloride	ND	10	ug/L	1.5
m-Xylene & p-Xylene	ND	5.0	ug/L	2.5
o-Xylene	ND	5.0	ug/L	1.0

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	99	(70 - 130)
1,2-Dichloroethane-d4	97	(60 - 140)
Toluene-d8	104	(70 - 130)

Client Sample ID: PTI-MW16-046

```

Lot-Sample #....: E0A280244-003  Work Order #....: D81AT101      Matrix.....: WATER
Date Sampled...: 01/28/00 10:45  Date Received...: 01/28/00 15:05  MS Run #.....: 0031123
Prep Date.....: 01/28/00      Analysis Date...: 01/29/00
Prep Batch #...: 0031334      Analysis Time...: 01:26
                                Method.....: SW846 8260B

```

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
<b>1,1-Dichloroethane</b>	<b>69</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
<b>1,2-Dichloroethane</b>	<b>7.5</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
<b>1,1-Dichloroethene</b>	<b>14</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
<b>cis-1,2-Dichloroethene</b>	<b>15</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.30</b>
<b>trans-1,2-Dichloroethene</b>	<b>3.4</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
<b>Trichloroethene</b>	<b>18</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	97	(70 - 130)
1,2-Dichloroethane-d4	90	(60 - 140)
Toluene-d8	105	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-EB2-046

## GC/MS Volatiles

Lot-Sample #...: E0A280244-004    Work Order #...: D81AW101    Matrix.....: WATER  
 Date Sampled...: 01/28/00 10:10    Date Received...: 01/28/00 15:05    MS Run #.....: 0031123  
 Prep Date.....: 01/28/00    Analysis Date...: 01/28/00  
 Prep Batch #...: 0031334    Analysis Time...: 23:25  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
Trichloroethene	ND	1.0	ug/L	0.20
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	89	(60 - 140)
Toluene-d8	105	(70 - 130)

**Client Sample ID: PTI-MW15D-046**

Lot-Sample #....	E0A280244-005	Work Order #....	D81C0101	Matrix.....	WATER
Date Sampled....	01/28/00 09:05	Date Received...	01/28/00 15:05	MS Run #.....	0031123
Prep Date.....	01/28/00	Analysis Date...	01/29/00		
Prep Batch #....	0031334	Analysis Time...	01:57		
		Method.....	SW846 8260B		

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
<b>Tetrachloroethene</b>	<b>5.3</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
<b>Trichloroethene</b>	<b>9.7</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	89	(60 - 140)
Toluene-d8	104	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15S-046

## GC/MS Volatiles

Lot-Sample #...: E0A280244-006    Work Order #...: D81C4101    Matrix.....: WATER  
 Date Sampled...: 01/28/00 08:15    Date Received...: 01/28/00 15:05    MS Run #.....: 0031123  
 Prep Date.....: 01/28/00    Analysis Date...: 01/29/00  
 Prep Batch #...: 0031334    Analysis Time...: 02:27  
 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
<b>Chloroform</b>	<b>2.9</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
<b>1,1-Dichloroethane</b>	<b>10</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
<b>1,2-Dichloroethane</b>	<b>23</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
<b>1,1-Dichloroethene</b>	<b>5.3</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
<b>cis-1,2-Dichloroethene</b>	<b>13</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.30</b>
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
<b>Ethylbenzene</b>	<b>9.3</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
<b>Trichloroethene</b>	<b>25</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.20</b>
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	100	(60 - 140)
Toluene-d8	100	(70 - 130)

## PHIBRO-TECH, INC.

Client Sample ID: PTI-TB4-046

## GC/MS Volatiles

Lot-Sample #....: E0A280244-007    Work Order #....: D81C9101    Matrix.....: WATER  
 Date Sampled....: 01/28/00    Date Received...: 01/28/00 15:05    MS Run #.....: 0031123  
 Prep Date.....: 01/28/00    Analysis Date...: 01/28/00  
 Prep Batch #....: 0031334    Analysis Time...: 22:55  
                                   Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Benzene	ND	1.0	ug/L	0.30
Bromodichloromethane	ND	1.0	ug/L	0.20
Bromoform	ND	1.0	ug/L	0.30
Bromomethane	ND	2.0	ug/L	0.50
Carbon tetrachloride	ND	1.0	ug/L	0.30
Chlorobenzene	ND	1.0	ug/L	0.30
Dibromochloromethane	ND	1.0	ug/L	0.20
Chloroethane	ND	2.0	ug/L	0.30
Chloroform	ND	1.0	ug/L	0.20
Chloromethane	ND	2.0	ug/L	0.30
1,2-Dichlorobenzene	ND	1.0	ug/L	0.20
1,3-Dichlorobenzene	ND	1.0	ug/L	0.20
1,4-Dichlorobenzene	ND	1.0	ug/L	0.30
1,1-Dichloroethane	ND	1.0	ug/L	0.20
1,2-Dichloroethane	ND	1.0	ug/L	0.20
1,1-Dichloroethene	ND	1.0	ug/L	0.20
cis-1,2-Dichloroethene	ND	1.0	ug/L	0.30
trans-1,2-Dichloroethene	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.20
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.20
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.50
Ethylbenzene	ND	1.0	ug/L	0.20
Methylene chloride	ND	1.0	ug/L	0.20
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.30
Tetrachloroethene	ND	1.0	ug/L	0.20
Toluene	ND	1.0	ug/L	0.20
1,1,1-Trichloroethane	ND	1.0	ug/L	0.20
1,1,2-Trichloroethane	ND	1.0	ug/L	0.20
Trichloroethene	ND	1.0	ug/L	0.20
Trichlorofluoromethane	ND	2.0	ug/L	0.20
Vinyl chloride	ND	2.0	ug/L	0.30
m-Xylene & p-Xylene	ND	1.0	ug/L	0.50
o-Xylene	ND	1.0	ug/L	0.20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	88	(60 - 140)
Toluene-d8	104	(70 - 130)

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW9-046

General Chemistry

Lot-Sample #...: E0A280244-001    Work Order #...: D81AM    Matrix.....: WATER

Date Sampled...: 01/28/00 12:00    Date Received...: 01/28/00 15:05

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.0	0.10	No Units	SW846 9040B	01/28/00	0028414
			Analysis Time...: 16:52	MS Run #.....:	MDL.....:	
Hexavalent Chromium	14.1	10.0	mg/L	SW846 7196A	01/28/00	0028415
			Analysis Time...: 17:17	MS Run #.....:	MDL.....: 5.0	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW37-046

General Chemistry

Lot-Sample #....: E0A280244-002    Work Order #....: D81AQ    Matrix.....: WATER  
 Date Sampled....: 01/28/00 11:15    Date Received...: 01/28/00 15:05

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	6.9	0.10	No Units	SW846 9040B	01/28/00	0028414
			Analysis Time...: 16:59	MS Run #.....:	MDL.....:	
Hexavalent Chromium	13.5	10.0	mg/L	SW846 7196A	01/28/00	0028415
			Analysis Time...: 17:18	MS Run #.....:	MDL.....: 5.0	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW16-046

General Chemistry

Lot-Sample #...: E0A280244-003    Work Order #...: D81AT    Matrix.....: WATER  
 Date Sampled...: 01/28/00 10:45    Date Received...: 01/28/00 15:05

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	7.2	0.10	No Units	SW846 9040B	01/28/00	0028414
		Analysis Time...: 17:02		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/28/00	0028415
		Analysis Time...: 17:19		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-EB2-046

General Chemistry

Lot-Sample #...: E0A280244-004    Work Order #...: D81AW    Matrix.....: WATER  
Date Sampled...: 01/28/00 10:10    Date Received...: 01/28/00 15:05

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH	5.3	0.10	No Units	SW846 9040B	01/28/00	0028414
		Analysis Time...: 17:05		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/28/00	0028415
		Analysis Time...: 17:20		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15D-046

General Chemistry

Lot-Sample #...: E0A280244-005    Work Order #...: D81C0    Matrix.....: WATER  
 Date Sampled...: 01/28/00 09:05    Date Received...: 01/28/00 15:05

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	8.4	0.10	No Units	SW846 9040B	01/28/00	0028414
		Analysis Time...: 17:08		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/28/00	0028415
		Analysis Time...: 17:21		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15S-046

General Chemistry

Lot-Sample #...: E0A280244-006    Work Order #...: D81C4    Matrix.....: WATER  
Date Sampled...: 01/28/00 08:15    Date Received...: 01/28/00 15:05

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH	7.3	0.10	No Units	SW846 9040B	01/28/00	0028414
		Analysis Time...: 17:12		MS Run #.....:	MDL.....:	
Hexavalent Chromium	ND	0.020	mg/L	SW846 7196A	01/28/00	0028415
		Analysis Time...: 17:20		MS Run #.....:	MDL.....: 0.010	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW9-046

DISSOLVED Metals

Lot-Sample #...: E0A280244-001

Matrix.....: WATER

Date Sampled...: 01/28/00 12:00 Date Received...: 01/28/00 15:05

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0031210						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D81AM104
		Analysis Time...: 18:02		MS Run #.....: 0031069	MDL.....: 0.00050	
Chromium	13.9	0.010	mg/L	SW846 6010B	01/31-02/01/00	D81AM105
		Analysis Time...: 18:02		MS Run #.....: 0031069	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D81AM106
		Analysis Time...: 18:02		MS Run #.....: 0031069	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW37-046

DISSOLVED Metals

Lot-Sample #...: E0A280244-002

Matrix.....: WATER

Date Sampled...: 01/28/00 11:15 Date Received...: 01/28/00 15:05

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0031210						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D81AQ104
		Analysis Time...: 18:21		MS Run #.....: 0031069	MDL.....: 0.00050	
Chromium	13.2	0.010	mg/L	SW846 6010B	01/31-02/01/00	D81AQ105
		Analysis Time...: 18:21		MS Run #.....: 0031069	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D81AQ106
		Analysis Time...: 18:21		MS Run #.....: 0031069	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW16-046

DISSOLVED Metals

Lot-Sample #...: E0A280244-003

Matrix.....: WATER

Date Sampled...: 01/28/00 10:45 Date Received...: 01/28/00 15:05

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0031210						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D81AT104
		Analysis Time...: 18:26		MS Run #.....: 0031069	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D81AT105
		Analysis Time...: 18:26		MS Run #.....: 0031069	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D81AT106
		Analysis Time...: 18:26		MS Run #.....: 0031069	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-EB2-046

DISSOLVED Metals

Lot-Sample #...: E0A280244-004

Matrix.....: WATER

Date Sampled...: 01/28/00 10:10 Date Received...: 01/28/00 15:05

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0031210						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D81AW104
		Analysis Time...: 18:33		MS Run #.....: 0031069	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D81AW105
		Analysis Time...: 18:33		MS Run #.....: 0031069	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D81AW106
		Analysis Time...: 18:33		MS Run #.....: 0031069	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15D-046

DISSOLVED Metals

Lot-Sample #...: E0A280244-005

Matrix.....: WATER

Date Sampled...: 01/28/00 09:05 Date Received...: 01/28/00 15:05

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
<b>Prep Batch #...: 0031210</b>						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D81C0104
		Analysis Time...: 18:37		MS Run #.....: 0031069	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D81C0105
		Analysis Time...: 18:37		MS Run #.....: 0031069	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D81C0106
		Analysis Time...: 18:37		MS Run #.....: 0031069	MDL.....: 0.0040	

PHIBRO-TECH, INC.

Client Sample ID: PTI-MW15S-046

DISSOLVED Metals

Lot-Sample #...: E0A280244-006

Matrix.....: WATER

Date Sampled...: 01/28/00 08:15 Date Received...: 01/28/00 15:05

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...	0031210					
Cadmium	0.012	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D81C4104
		Analysis Time..: 21:10		MS Run #.....: 0031069	MDL.....: 0.00050	
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D81C4105
		Analysis Time..: 21:10		MS Run #.....: 0031069	MDL.....: 0.0010	
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D81C4106
		Analysis Time..: 21:10		MS Run #.....: 0031069	MDL.....: 0.0040	

# QC DATA ASSOCIATION SUMMARY

E0A280244

## Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	SW846 7196A		0028415	
	WATER	SW846 9040B		0028414	
	WATER	SW846 8260B		0031334	0031123
	WATER	SW846 6010B		0031210	0031069
002	WATER	SW846 7196A		0028415	
	WATER	SW846 9040B		0028414	
	WATER	SW846 8260B		0031334	0031123
	WATER	SW846 6010B		0031210	0031069
003	WATER	SW846 7196A		0028415	
	WATER	SW846 9040B		0028414	
	WATER	SW846 8260B		0031334	0031123
	WATER	SW846 6010B		0031210	0031069
004	WATER	SW846 7196A		0028415	
	WATER	SW846 9040B		0028414	
	WATER	SW846 8260B		0031334	0031123
	WATER	SW846 6010B		0031210	0031069
005	WATER	SW846 7196A		0028415	
	WATER	SW846 9040B		0028414	
	WATER	SW846 8260B		0031334	0031123
	WATER	SW846 6010B		0031210	0031069
006	WATER	SW846 7196A		0028415	
	WATER	SW846 9040B		0028414	
	WATER	SW846 8260B		0031334	0031123
	WATER	SW846 6010B		0031210	0031069
007	WATER	SW846 8260B		0031334	0031123

# METHOD BLANK REPORT

## GC/MS Volatiles

Client Lot #...: E0A280244  
MB Lot-Sample #: E0A310000-334

Work Order #...: D82N6101

Matrix.....: WATER

Prep Date.....: 01/28/00

Analysis Time...: 21:47

Analysis Date...: 01/28/00

Prep Batch #...: 0031334

PARAMETER	RESULT	REPORTING		
		LIMIT	UNITS	METHOD
Benzene	ND	1.0	ug/L	SW846 8260B
Bromodichloromethane	ND	1.0	ug/L	SW846 8260B
Bromoform	ND	1.0	ug/L	SW846 8260B
Bromomethane	ND	2.0	ug/L	SW846 8260B
Carbon tetrachloride	ND	1.0	ug/L	SW846 8260B
Chlorobenzene	ND	1.0	ug/L	SW846 8260B
Dibromochloromethane	ND	1.0	ug/L	SW846 8260B
Chloroethane	ND	2.0	ug/L	SW846 8260B
Chloroform	ND	1.0	ug/L	SW846 8260B
Chloromethane	ND	2.0	ug/L	SW846 8260B
1,2-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,3-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,4-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,1-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,2-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,1-Dichloroethene	ND	1.0	ug/L	SW846 8260B
cis-1,2-Dichloroethene	ND	1.0	ug/L	SW846 8260B
trans-1,2-Dichloroethene	ND	1.0	ug/L	SW846 8260B
1,2-Dichloropropane	ND	1.0	ug/L	SW846 8260B
cis-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
trans-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
Ethylbenzene	ND	1.0	ug/L	SW846 8260B
Methylene chloride	ND	1.0	ug/L	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	SW846 8260B
Tetrachloroethene	ND	1.0	ug/L	SW846 8260B
Toluene	ND	1.0	ug/L	SW846 8260B
1,1,1-Trichloroethane	ND	1.0	ug/L	SW846 8260B
1,1,2-Trichloroethane	ND	1.0	ug/L	SW846 8260B
Trichloroethene	ND	1.0	ug/L	SW846 8260B
Trichlorofluoromethane	ND	2.0	ug/L	SW846 8260B
Vinyl chloride	ND	2.0	ug/L	SW846 8260B
m-Xylene & p-Xylene	ND	1.0	ug/L	SW846 8260B
o-Xylene	ND	1.0	ug/L	SW846 8260B

SURROGATE	PERCENT	RECOVERY
	RECOVERY	LIMITS
Bromofluorobenzene	96	(70 - 130)
1,2-Dichloroethane-d4	83	(60 - 140)
Toluene-d8	105	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: E0A280244

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Hexavalent Chromium	ND	Work Order #: D81K0101		MB Lot-Sample #:	E0A280000-415	
		0.020	mg/L	SW846 7196A	01/28/00	0028415
		Analysis Time...: 17:26				

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: E0A280244

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
<b>MB Lot-Sample #: E0A310000-210 Prep Batch #...: 0031210</b>						
Cadmium	ND	0.0050	mg/L	SW846 6010B	01/31-02/01/00	D82CG101
		Analysis Time...: 17:51				
Chromium	ND	0.010	mg/L	SW846 6010B	01/31-02/01/00	D82CG102
		Analysis Time...: 17:51				
Copper	ND	0.025	mg/L	SW846 6010B	01/31-02/01/00	D82CG103
		Analysis Time...: 17:51				

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A280244      Work Order #...: D82N6102      Matrix.....: WATER  
 LCS Lot-Sample#: E0A310000-334  
 Prep Date.....: 01/28/00      Analysis Date...: 01/28/00  
 Prep Batch #...: 0031334      Analysis Time...: 21:08

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
Benzene	10.0	8.68	ug/L	87	SW846 8260B
Chlorobenzene	10.0	9.28	ug/L	93	SW846 8260B
1,1-Dichloroethene	10.0	8.40	ug/L	84	SW846 8260B
Toluene	10.0	9.16	ug/L	92	SW846 8260B
Trichloroethene	10.0	9.01	ug/L	90	SW846 8260B

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Bromofluorobenzene	97	(70 - 130)
1,2-Dichloroethane-d4	86	(60 - 140)
Toluene-d8	106	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

# LABORATORY CONTROL SAMPLE DATA REPORT

## General Chemistry

Client Lot #...: E0A280244

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	9.18	8.78	No Units	96	SW846 9040B	01/28/00	0028414
Work Order #: D81K1101 LCS Lot-Sample#: E0A280000-414							
Analysis Time...: 16:49							
Hexavalent Chromium	0.0500	0.0515	mg/L	103	SW846 7196A	01/28/00	0028415
Work Order #: D81K0102 LCS Lot-Sample#: E0A280000-415							
Analysis Time...: 17:25							

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# LABORATORY CONTROL SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #...: E0A280244

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: E0A310000-210 Prep Batch #...: 0031210							
Cadmium	0.0500	0.0552	mg/L	110	SW846 6010B	01/31-02/01/00	D82CG104
Analysis Time...: 17:51							
Chromium	0.200	0.226	mg/L	113	SW846 6010B	01/31-02/01/00	D82CG105
Analysis Time...: 17:51							
Copper	0.250	0.282	mg/L	113	SW846 6010B	01/31-02/01/00	D82CG106
Analysis Time...: 17:51							

### NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

# MATRIX SPIKE SAMPLE DATA REPORT

## GC/MS Volatiles

Client Lot #...: E0A280244      Work Order #...: D7WE0104-MS      Matrix.....: WATER  
 MS Lot-Sample #: E0A260233-001      D7WE0105-MSD  
 Date Sampled...: 01/26/00 08:10      Date Received...: 01/26/00 19:55      MS Run #.....: 0031123  
 Prep Date.....: 01/28/00      Analysis Date...: 01/29/00  
 Prep Batch #...: 0031334      Analysis Time...: 06:59

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCENT RECOVERY	RPD	METHOD
Benzene	ND	10.0	8.62	ug/L	86		SW846 8260B
	ND	10.0	8.82	ug/L	88	2.3	SW846 8260B
Chlorobenzene	ND	10.0	8.92	ug/L	89		SW846 8260B
	ND	10.0	8.97	ug/L	90	0.55	SW846 8260B
1,1-Dichloroethene	ND	10.0	7.82	ug/L	78		SW846 8260B
	ND	10.0	8.21	ug/L	82	4.9	SW846 8260B
Toluene	ND	10.0	8.70	ug/L	87		SW846 8260B
	ND	10.0	8.75	ug/L	88	0.57	SW846 8260B
Trichloroethene	ND	10.0	8.88	ug/L	89		SW846 8260B
	ND	10.0	9.20	ug/L	92	3.5	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	100	(70 - 130)
	100	(70 - 130)
1,2-Dichloroethane-d4	93	(60 - 140)
	94	(60 - 140)
Toluene-d8	105	(70 - 130)
	104	(70 - 130)

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

# MATRIX SPIKE SAMPLE DATA REPORT

## DISSOLVED Metals

Client Lot #....: E0A280244

Matrix.....: WATER

Date Sampled....: 01/28/00 12:00 Date Received...: 01/28/00 15:05

PARAMETER	AMOUNT	SAMPLE AMT	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
-----------	--------	------------	--------------	-----------------	-------	---------------	-----	--------	----------------------------	--------------

MS Lot-Sample #: E0A280244-001 Prep Batch #....: 0031210

Cadmium

ND	0.050	0.0518	mg/L	101		SW846	6010B	01/31-02/01/00	D81AM108
ND	0.050	0.0514	mg/L	100	0.67	SW846	6010B	01/31-02/01/00	D81AM109

Analysis Time...: 18:12

MS Run #.....: 0031069

Chromium

13.9	0.200	13.5	NC	mg/L		SW846	6010B	01/31-02/01/00	D81AM10A
13.9	0.200	13.1	NC	mg/L		SW846	6010B	01/31-02/01/00	D81AM10C

Analysis Time...: 18:12

MS Run #.....: 0031069

Copper

ND	0.250	0.264	mg/L	103		SW846	6010B	01/31-02/01/00	D81AM10D
ND	0.250	0.254	mg/L	100	3.7	SW846	6010B	01/31-02/01/00	D81AM10E

Analysis Time...: 18:12

MS Run #.....: 0031069

### NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

Appendix C  
Completed COC Forms

# Chain of Custody Record



QUA-4124 0797

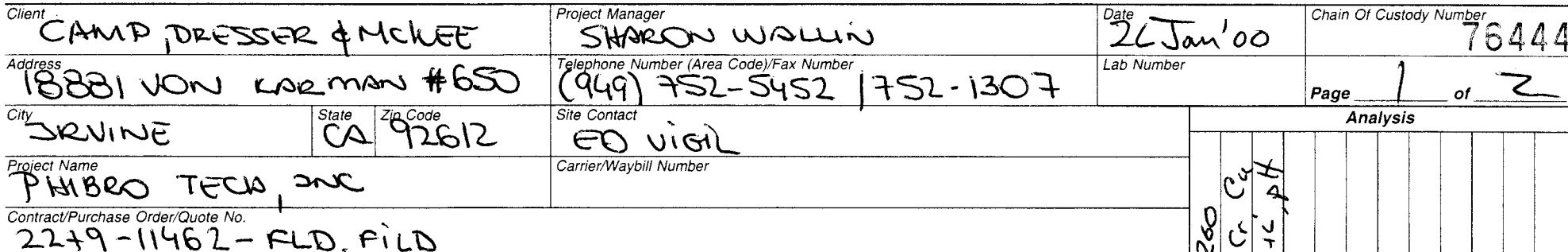
Client <b>Camp Dresser + McKee</b>	Project Manager <b>Sharon Walin</b>	Date <b>25 Jun 2000</b>	Chain of Custody Number <b>08345</b>
Address <b>18881 Von Karman #650</b>	Telephone Number (Area Code)/Fax Number <b>949-752-5452 / 752-1307</b>	Lab Number	Page <b>1</b> of <b>1</b>

City <b>Irving CA</b>	State	Zip Code <b>92612</b>	Site Contact <b>Ed Vigil</b>	Lab Contact <b>Diane Suzuki</b>	Analysis (Attach list if more space is needed)										Special Instructions/ Conditions of Receipt							
Project Name <b>Phibro Tech</b>			Carrier/Waybill Number																			
Contract/Purchase Order/Quote No. <b>2279-11462-FLD.FILD</b>			Matrix		Containers & Preservatives																	
Sample I.D. No. and Description (Containers for each sample may be combined on one line)			Date	Time	Aqueous	Sed.	Soil	Gravel	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc2		NaOH	8260	Cu, Cr, Cd	Pb, Cr +6	24hr hold	Field Filtered	
<b>PTI-MWID-046</b>			<b>25 Jun 00</b>	<b>1500</b>	X				3			X				X						
<b>↓</b>			<b>↓</b>	<b>↓</b>					1				X			X						
<b>PTI-MW-TBI-046</b>			<b>↓</b>	<b>⊕</b>					3			X				X						

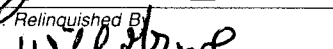
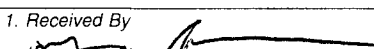

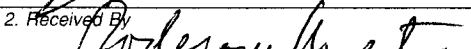
Possible Hazard Identification				Sample Disposal				(A fee may be assessed if samples are retained longer than 3 months)			
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client	<input checked="" type="checkbox"/> Disposal By Lab	<input type="checkbox"/> Archive For _____ Months				
Turn Around Time Required				QC Requirements (Specify)							
<input type="checkbox"/> 24 Hours	<input type="checkbox"/> 48 Hours	<input type="checkbox"/> 7 Days	<input checked="" type="checkbox"/> 14 Days	<input type="checkbox"/> 21 Days	<input type="checkbox"/> Other _____						
1. Relinquished By <b>Sharon Walin</b>				Date <b>25 Jun 00</b>	Time <b>1603</b>	1. Received By <b>Kamien Bente</b>				Date <b>1-25-00</b>	Time <b>16:03</b>
2. Relinquished By <b>Kamien Bente</b>				Date <b>1/25/00</b>	Time <b>5:28 PM</b>	2. Received By <b>Charles Bente</b>				Date <b>1/25/00</b>	Time <b>17:28</b>
3. Relinquished By				Date	Time	3. Received By				Date	Time

Comments

## QUA-4124

[illegible]

### Special Instructions

Possible Hazard Identification		Sample Disposal	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Turn Around Time Required		Project Specific (Specify)	
<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush		<input type="checkbox"/> I. <input type="checkbox"/> II. <input type="checkbox"/> III.	
1. Relinquished By 		1. Received By 	
Date 26 Jan 08		Date 1-26-08	
Time 1708		Time 1708	
2. Relinquished By 		2. Received By 	
Date 1-26-08		Date 1/26/08	
Time 6:10		Time 18:10	
3. Relinquished By		3. Received By	
Date		Date	
Time		Time	

---

*Comments*



Client <b>CDM</b>		Project Manager		Date <b>26 Jan 00</b>	Chain Of Custody Number <b>76445</b>	
Address <b>See Page 1 of 2</b>		Telephone Number (Area Code)/Fax Number		Lab Number		Page <b>2</b> of <b>2</b>
City	State	Zip Code	Site Contact		Analysis	
Project Name			Carrier/Waybill Number		<div style="text-align: center;"> <b>C4</b>  <b>+P4</b> </div>	
Contract/Purchase Order/Quote No.						

[illegible]

### Special Instructions

Possible Hazard Identification		Sample Disposal	
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B
<input type="checkbox"/> Unknown			
Turn Around Time Required		Project Specific (Specify)	
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush		
1. Relinquished By		1. Received By	
Date		Date	
Time		Time	
2. Relinquished By		2. Received By	
Date		Date	
Time		Time	
3. Relinquished By		3. Received By	
Date		Date	
Time		Time	

---

*Comments*

\_\_\_\_\_



QUA-4124 0797

Client COMP, DRESSER & MCKEE	Project Manager SHARON WALIN	Date 01/27/2000	Chain of Custody Number 08346
Address 18881 VON KARMAN SUITE 650	Telephone Number (Area Code)/Fax Number (949) 752-5452 / 752-1307	Lab Number	Page 1 of 2

City IRVINE	State CA	Zip Code 92612	Site Contact ED VIGIL	Lab Contact	Analysis (Attach list if more space is needed)										Special Instructions/
Project Name PHIBRO TECH, INC.			Carrier/Waybill Number		C3	bn									

[illegible][illegible]

Possible Hazard Identification					Sample Disposal			(A fee may be assessed if samples are retained longer than 3 months)
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input checked="" type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client	<input checked="" type="checkbox"/> Disposal By Lab	<input type="checkbox"/> Archive For _____ Months	

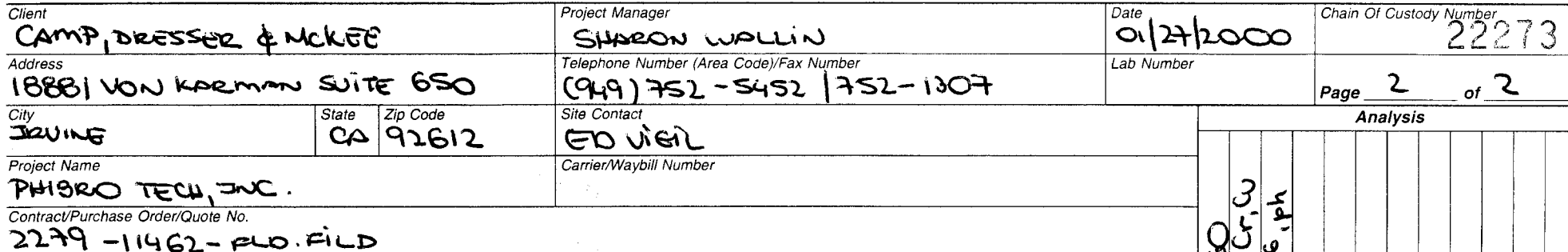
Turn Around Time Required ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other: no time

1. Relinquished By <i>Will Stone</i>	Date <i>01/27/00</i>	Time <i>1611</i>	1. Received By <i>Kalut S. Jh.</i>	Date <i>27 Jan 00</i>	Time <i>1611</i>
2. Relinquished By <i>Kalut S. Jh.</i>	Date <i>1/27/00</i>	Time <i>1734</i>	2. Received By <i>Kodiyum Raut</i>	Date <i>1/27/00</i>	Time <i>17:34</i>
3. Relinquished By	Date	Time	3. Received By	Date	Time

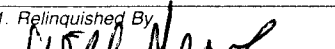
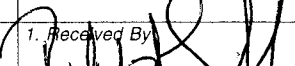
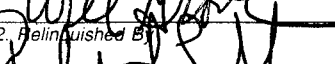
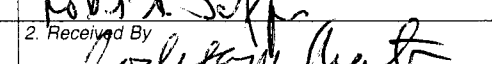
**Comments**

**DISTRIBUTION:** WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

QUA-4124

[illegible]

### Special Instructions

Possible Hazard Identification			Sample Disposal		
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input checked="" type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client
			<input checked="" type="checkbox"/> Disposal By Lab		
			<input type="checkbox"/> Archive For _____ Months		
Turn Around Time Required		QC Level	Project Specific (Specify)		
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush	<input type="checkbox"/> I. <input type="checkbox"/> II. <input type="checkbox"/> III.			
1. Relinquished By	Date	Time	1. Received By	Date	Time
	9/27/00	1611		27 Jan 00	1611
2. Relinquished By	Date	Time	2. Received By	Date	Time
	1/27/00	1734		1/27/00	17:30
3. Relinquished By	Date	Time	3. Received By	Date	Time

---

*Comments*

# Chain of Custody Record



QUA-4124

Client <b>Camp Dresser &amp; McKee</b>		Project Manager <b>Sharon Wallin</b>		Date <b>28 Jan 00</b>	Chain Of Custody Number <b>76233</b>
Address <b>18881 Von Karman #650</b>		Telephone Number (Area Code)/Fax Number <b>949-752-5452, 752-1307</b>		Lab Number	Page <b>1</b> of <b>2</b>
City <b>Irvine</b>	State <b>CA</b>	Zip Code <b>92612</b>	Site Contact <b>ED Vigil</b>	Analysis	
Project Name <b>Phibro Tech Fuc</b>			Carrier/Waybill Number		
Contract/Purchase Order/Quote No. <b>2279-11462-FLD, FIEL</b>					

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers		Preservative	Condition on Receipt	Cd	Cr	pH	Analysis
					Type	No.						
PTI-MW9-046	28 Jan 00	1200	W		VOA	3	HCl		x			
↓		↓			1000ml	1	NaOH		x			Field Filtered
PTI-MW37-046		1115			500ml	1				x		24 hr hold
↓		↓			VOA	3	HCl		x			Field Filtered
PTI-MW16-046		1045			1000ml	1	NaOH		x			24 hr hold
↓		↓			500ml	1				x		
PTI-EB2-046		1010			VOA	3			x			Field Filtered
↓		↓			1000ml	1				x		24 hr hold
PTI-MW15D-046		0905			500ml	1			x			24 hr hold
↓		↓			VOA	2			x			24 hr hold
↓		↓			1000	1				x		Field Filtered
					SOD	1				x		24 hr hold

Special Instructions

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Turn Around Time Required

☐ Normal ☐ Rush

Relinquished By

2. Relinquished By

3. Relinquished By

Comments

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For \_\_\_\_\_ Months

Project Specific (Specify)

1. Received By

2. Received By

3. Received By

Date

Date

Date

Time

Time

Time



**Quanterra**

Client <b>CDM</b>		Project Manager		Date <b>28 Jan 00</b>	Chain Of Custody Number <b>76232</b>	
Address <b>See pg 1 of 2</b>		Telephone Number (Area Code)/Fax Number		Lab Number		Page <b>2</b> of <b>2</b>
City	State	Zip Code	Site Contact		Analysis	
Project Name		Carrier/Waybill Number		<div style="text-align: center;"> <b>ISO</b>  <b>DH</b>  <b>P</b> </div>		
Contract/Purchase Order/Quote No.						

[illegible]

### Special Instructions

Possible Hazard Identification			Sample Disposal		
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client
			<input type="checkbox"/> Disposal By Lab		
			<input type="checkbox"/> Archive For _____ Months		
Turn Around Time Required		QC Level	Project Specific (Specify)		
<input type="checkbox"/> Normal	<input type="checkbox"/> Rush	<input type="checkbox"/> I. <input type="checkbox"/> II. <input type="checkbox"/> III.			
1. Relinquished By	Date	Time	1. Received By	Date	Time
Will Gronk	28 Jan 07	1505	Stodgryn	28 Jan 07	1505
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

**DISTRIBUTION:** WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Appendix D  
Background Groundwater Concentrations



# City of Santa Fe Springs 1998 Annual Water Quality Report

*The City of Santa Fe Springs is pleased to provide the following Water Quality Report, an annual report card on the quality of water provided by the Santa Fe Springs Water Utility. After review, you'll find that your water is safe, drinkable and of good quality.*

## What is the source of my drinking water?

This report describes the drinking water quality of local groundwater sources and the Metropolitan Water District of Southern California's imported surface water from the Colorado River and the State Water Project in Northern California.

## How is my drinking water tested?

Your drinking water is protected from unsafe levels of chemicals and bacteria by regularly scheduled testing of the water. Drinking water wells are tested at intervals required by the California Department of Health Services. Scheduled testing of wells is weekly, monthly, quarterly, annually or up to once every five years depending on the type of chemical, the vulnerability of the well to contamination and historic water quality information.

Central Basin Municipal Water District administers the testing program for Santa Fe Springs. A state- certified laboratory collects well samples and tests them using state-of-the-art instruments. Likewise, the Metropolitan Water District tests the quality of imported surface water.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Federal Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

## What are drinking water standards?

The federal Environmental Protection Agency (EPA) sets standards that limit the amount of certain contaminants in domestic drinking water. In California, the Department of Health Services regulates drinking water quality by enforcing standards that are at least as stringent as federal EPA standards. Public Health Goals (PHGs) are set by the California Environmental Protection Agency. Historically, California standards are more stringent than their federal counterparts.

There are two types of standards that protect your water supply. Primary standards are used to protect you from chemicals that could potentially affect your health. Secondary standards regulate chemicals that affect the taste, odor and appearance of the water. Regulations establish a Maximum Contaminant Level (MCL) for each standard. Water suppliers must ensure their customers a safe supply of water by complying with MCLs. Action Levels have been established to regulate chemicals not covered by the MCLs.

## How do I read the water quality report?

The information on the chart shows the results from the most recent testing performed in accordance with state and federal drinking water regulations. To review the quality of your drinking water, compare the range and MCL.

Some people may be more vulnerable to contamination in drinking water than the general population. These people should seek advice about drinking water from their health care providers. The EPA's Safe Drinking Water Hotline (800-426-4791) also provides guidelines on appropriate means to lessen the risk of infection.

*If you have specific questions regarding your system's drinking water, please call (562) 868-0511.*

PRIMARY STANDARDS (MANDATED FOR PUBLIC HEALTH)	GROUNDWATER		SURFACE WATER		PRIMARY MCL	PHG	MAJOR SOURCES IN DRINKING WATER	
	AVERAGE	RANGE	AVERAGE	RANGE				
CLARITY								
TURBIDITY (ntu) (a)	0.1	0.1-0.4	0.07	0.05-0.08	TT	NONE	Soil runoff	
MICROBIOLOGICAL (% POSITIVE)								
TOTAL COLIFORM BACTERIA (a)	0	0	0.08	0-0.08	5	0	Naturally present in the environment	
No. of Acute Violations	0	0	0	0				
ORGANIC CHEMICALS - µg/l (h)								
TETRACHLOROETHYLENE - PCE	0.2	ND-1.1	ND	ND	5	0	Industrial discharge	
TRICHLOROETHYLENE - TCE	2.4	ND-1.3	ND	ND	3	0	Industrial discharge	
TRICHALOMETHANES, TOTAL-TTHMS (c) (b)	4.4	41-52	37	28-60	100	0	By-product of drinking water chlorination	
INORGANICS	DATE SAMPLED (e)							
ARSENIC (µg/l)	1996-1998	3.1	ND-7.2	2.4	1.3-3.0	50	NONE	Erosion of natural deposits
BARIUM (µg/l)	1996-1998	ND	ND	85	80-89	1000	2000	Erosion of natural deposits
COPPER (mg/l)	1998	0.34 (c)	ND-0.67	ND (c)	ND-0.01	1.3 AL (d)	.17 (f)	Corrosion of domestic plumbing
FLUORIDE (mg/l)	1996-1998	0.31	0.29-0.32	0.29	0.20-0.35	2	1 (f)	Erosion of natural deposits
LEAD (µg/l)	1998	<5 (c)	<5	ND (c)	ND	15 AL (d)	2 (f)	Corrosion of domestic plumbing
NICKEL (µg/l)	1996-1998	ND	ND	2	2	100	NONE	Erosion of natural deposits
NITRITE (mg/l as N)	1998	4.6	ND-8.6 (i)	0.2	0.1-0.3	10	10 (f)	Agricultural runoff; sewage; erosion of natural deposits
ALUMINUM (µg/l)	1996-1998	ND	ND	135	76-240	1000	NONE	Erosion of natural deposits
RADIOLOGICAL - pCi/l	DATE SAMPLED (e)							
GROSS ALPHA	1996-1998	2.8	ND-5.6	6.6	ND-11.7	15	0	Erosion of natural deposits
GROSS BETA		NA	NA	7.3	1.2-11.2	50	0	Decay of natural and man-made deposits
URANIUM	1996-1998	5.3	4.5-6.0	4.7	3.3-5.7	20	0	Erosion of natural deposits
RADIUM-226		NA	NA	0.6	ND-2.8	5	0	Erosion of natural deposits
RADIUM-228		NA	NA	0.5	ND-1.6	5	0	Erosion of natural deposits
STRONTIUM-90		NA	NA	ND	ND-1.3	8	0	Erosion of natural deposits
SECONDARY STANDARDS								
CHLORIDE (mg/l)		60	18-87	76	62-886	250-600	NONE	
UNITS OF COLOR (a)		<3	<3	2	1-3	15	NONE	
THRESHOLD ODOR NO. (ton) (a)		1	1-2	(g)	(g)	3	NONE	
IRON (µg/l)		54	ND-324	ND	ND	300	NONE	
pH (std unit)		7.8	7.0-8.5	8.0	8.0-8.1	6.5-8.5	NONE	
CONDUCTIVITY (umhos/cm)		829	390-1130	879	715-995	900-2200	NONE	
SULFATE (mg/l)		158	59-264	209	153-250	250-600	NONE	
TOTAL DISSOLVED SOLIDS (mg/l)		533	250-728	540	429-622	500-1500	NONE	
ADDITIONAL CONSTITUENTS								
TOTAL HARDNESS (mg/l)		290	37-406	259	206-301	-	NONE	
CALCIUM (mg/l)		87	15-130	64	51-75	-	NONE	
MAGNESIUM (mg/l)		22	19-27	24	19-28	-	NONE	
SODIUM (mg/l)		67	39-111	81	64-93	-	NONE	
POTASSIUM (mg/l)		3.8	1.4-5.6	3.9	3.5-4.6	-	NONE	
HALOACETIC ACIDS (µg/l)		-	-	24	13-40	-	NONE	
HALOACETONITRILES (µg/l)		-	-	8.2	6.1-12.0	-	NONE	
CHLOROPICRIN (µg/l)		-	-	ND	ND	-	NONE	
HALOKETONES (µg/l)		-	-	1.5	0.7-3.2	-	NONE	
CHLORAL HYDRATE (µg/l)		-	-	4.1	1.5-6.8	-	NONE	
TOTAL ORGANIC HALOGENS (TOX) (µg/l)		-	-	123	86-175	-	NONE	
CYANOGEN CHLORIDE (µg/l)		-	-	2.1	1.7-2.6	-	NONE	

### DEFINITIONS

MAXIMUM CONTAMINANT LEVEL (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available treatment technology.

MAXIMUM CONTAMINANT LEVEL GOAL (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health.

PUBLIC HEALTH GOAL (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

TREATMENT TECHNIQUE (TT): A required process intended to reduce the level of a contaminant in drinking water.

ACTION LEVEL (AC): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

PRIMARY DRINKING STANDARD: Primary MCLs, specific treatment techniques adopted in lieu of primary MCLs, and monitoring and reporting requirements for MCLs that are specified in regulations.

mg/l = MILLIGRAMS PER LITER (Parts per million)

µg/l = MICROGRAMS PER LITER (Parts per billion)

umhos/cm = MICROMHOS PER CENTIMETER

< = CONSTITUENT NOT DETECTED IN ANY SAMPLES AT THE REPORTING LIMIT

pCi/l = picoCuries PER LITER

ND = CONSTITUENT NOT DETECTED AT THE REPORTING LIMIT

NA = CONSTITUENT NOT ANALYZED

(a) Samples for these constituents were collected from points in the distribution system.

(b) Average and range calculated by running average.

(c) Values represent the 90th percentile of results from the most recent sampling event at customer's taps.

(d) Action level based on results from samples collected at selected customer's taps.

(e) Indicates dates sampled for groundwater sources only.

(f) California Public Health Goal (PHG). Other advisory levels listed in this column are federal Maximum Contaminant Level Goals (MCLGs).

(g) Metropolitan Water District of Southern California uses a flavor/flavor-profile test that more accurately detects odors.

(h) Up to 65 regulated and unregulated organics were analyzed. Only those detected at or above the reporting limit are listed.

(i) Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials on your home's plumbing. If you are concerned about elevated levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (800-426-4791).

Appendix E  
Statistical Analysis

Appendix E-1  
Calculation of Upper Tolerance Limits for Background

SUMMARY OF UPPER TOLERANCE LEVEL CALCULATIONS  
Quarterly Background Data: January 1989 to January 2000  
Southern California Chemical

POISSON DISTRIBUTED UPPER TOLERANCE LEVEL

COMPOUND	Hexa Chromium	Total Chromium	Cadmium	Copper	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Trichloroethene
Percent Detected	2.2%	8.9%	2.2%	24.4%	2.2%	8.9%	28.9%	31.1%	NOT
Sample number(n)	45	45	45	45	45	45	45	45	CALC.
Tn	0.5580	0.4011	0.1259	0.6618	14.1550	26.6050	41.2050	74.4550	
2Tn+2	3.12	2.80	2.25	3.32	30.31	55.21	84.41	150.91	
Chi Squared @95% of dist	7.81	5.99	5.99	7.81	43.77	73.31	106.39	179.58	
lamda Tn	0.271	0.187	0.150	0.289	14.742	44.973	99.787	301.117	
Two time Lamda Tn	0.541	0.373	0.300	0.577	29.484	89.945	199.573	602.234	
Beta cov. @95%, deg fr.	4	4	3	4	44	114	234	661	
k, from 2k+2 deg fr.	1.00	1.00	0.50	1.00	21.00	56.00	116.00	329.50	

AITCHISON ADJUSTMENT AND CALCULATION OF UPPER TOLERANCE LEVELS

Number of ND(d)	NOT	41	NOT	34	NOT	41	32	31	NO ADJ. REQ.
Number of values(n)	CALC.	45	CALC.	45	CALC.	45	45	45	
Mean of det values		0.0475		0.029		1.650	1.977	4.050	
STD of det values		0.041		0.010		0.420	0.738	1.435	
Atch. Adj. mean/mean(1)		0.004		0.007		0.147	0.571	1.260	11.862
Atch. Adj. std./std. (1)		0.017		0.013		0.487	0.985	2.050	5.284
K for Tolerance Limit		2.353		1.812		2.353	1.782	1.771	1.680
Adjusted Tol. Limit		0.045		0.031		1.294	2.326	4.891	
Unadjusted Tol. Limit									20.741

(1) Unadjusted mean and std. used to compute upper tolerance level for TCE

Appendix E-2  
Nonparametric Kruskal-Wallis  
Mann-Whitney U Test Results



WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Group	Count	Rank Sum
-------	-------	----------

MW-11 45 2088.000  
 MW-1S 45 2007.000  
 Mann-Whitney U test statistic = 1053.000  
 Probability is 0.705  
 Chi-square approximation = 0.143 with 1 df

A

The following results are for:  
 PARAM\_ID\$ = EBN

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 90 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	45	2983.500
MW-1S	45	1111.500

Mann-Whitney U test statistic = 1948.500  
 Probability is 0.000  
 Chi-square approximation = 59.032 with 1 df

R

The following results are for:  
 PARAM\_ID\$ = HCR

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 90 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	45	2030.500
MW-1S	45	2064.500

Mann-Whitney U test statistic = 995.500  
 Probability is 0.841  
 Chi-square approximation = 0.040 with 1 df

A

The following results are for:  
 PARAM\_ID\$ = TCE

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 90 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-11	45	2970.000
MW-1S	45	1125.000

Mann-Whitney U test statistic = 1935.000  
 Probability is 0.000  
 Chi-square approximation = 55.445 with 1 df

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	45	2063.000
MW-1S	45	2032.000

Mann-Whitney U test statistic = 1028.000

Probability is 0.861

Chi-square approximation = 0.031 with 1 df

A

The following results are for:

PARAM\_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	44	2652.500
MW-1S	44	1263.500

Mann-Whitney U test statistic = 1662.500

Probability is 0.000

Chi-square approximation = 37.094 with 1 df

R

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-11	45	2769.000
MW-1S	45	1326.000

Mann-Whitney U test statistic = 1734.000

Probability is 0.000

Chi-square approximation = 34.959 with 1 df

R

SYSTAT Rectangular file O:\2279-111\Jan00\1-14s.syd,  
created Tue Mar 28, 2000 at 10:10:04, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-14S	37	1806.000
--------	----	----------

MW-1S	45	1597.000
-------	----	----------

Mann-Whitney U test statistic = 1103.000

Probability is 0.003

Chi-square approximation = 8.906 with 1 df

R

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-14S	37	1594.500
--------	----	----------

MW-1S	45	1808.500
-------	----	----------

Mann-Whitney U test statistic = 891.500

Probability is 0.415

Chi-square approximation = 0.665 with 1 df

A

The following results are for:

PARAM\_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-14S	37	1828.500
--------	----	----------

MW-1S	45	1574.500
-------	----	----------

Mann-Whitney U test statistic = 1125.500

Probability is 0.002

Chi-square approximation = 9.186 with 1 df

R

The following results are for:

PARAM\_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	37	2106.500
MW-1S	45	1296.500

Mann-Whitney U test statistic = 1403.500

Probability is 0.000

Chi-square approximation = 30.494 with 1 df

R

The following results are for:

PARAM\_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	37	1883.000
MW-1S	45	1520.000

Mann-Whitney U test statistic = 1180.000

Probability is 0.000

Chi-square approximation = 14.083 with 1 df

R

The following results are for:

PARAM\_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	37	2334.000
MW-1S	45	1069.000

Mann-Whitney U test statistic = 1631.000

Probability is 0.000

Chi-square approximation = 55.407 with 1 df

R

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	37	2174.000
MW-1S	45	1229.000

Mann-Whitney U test statistic = 1471.000  
 Probability is 0.000  
 Chi-square approximation = 42.413 with 1 df *R*

The following results are for:  
 PARAM\_ID\$ = TOL

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 80 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	36	1734.500
MW-1S	44	1505.500

Mann-Whitney U test statistic = 1068.500  
 Probability is 0.001  
 Chi-square approximation = 10.328 with 1 df *R*

The following results are for:  
 PARAM\_ID\$ = TX

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 82 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
MW-14S	37	1863.500
MW-1S	45	1539.500

Mann-Whitney U test statistic = 1160.500  
 Probability is 0.001  
 Chi-square approximation = 10.291 with 1 df *R*

SYSTAT Rectangular file O:\2279-111\Jan00\1-15s.syd,  
 created Tue Mar 28, 2000 at 10:10:38, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1610.500
--------	----	----------

MW-1S	45	1875.500
-------	----	----------

Mann-Whitney U test statistic = 869.500

Probability is 0.851

Chi-square approximation = 0.035 with 1 df

A

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1707.500
--------	----	----------

MW-1S	45	1778.500
-------	----	----------

Mann-Whitney U test statistic = 966.500

Probability is 0.129

Chi-square approximation = 2.308 with 1 df

A

The following results are for:

PARAM\_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1533.000
--------	----	----------

MW-1S	45	1953.000
-------	----	----------

Mann-Whitney U test statistic = 792.000

Probability is 0.472

Chi-square approximation = 0.518 with 1 df

A

The following results are for:

PARAM\_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases  
Dependent variable is VALUE  
Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1954.000
MW-1S	45	1532.000

Mann-Whitney U test statistic = 1213.000

Probability is 0.001

Chi-square approximation = 12.062 with 1 df

R

The following results are for:

PARAM\_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1577.000
--------	----	----------

MW-1S	45	1909.000
-------	----	----------

Mann-Whitney U test statistic = 836.000

Probability is 0.805

Chi-square approximation = 0.061 with 1 df

A

The following results are for:

PARAM\_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1049.500
--------	----	----------

MW-1S	45	2436.500
-------	----	----------

Mann-Whitney U test statistic = 308.500

Probability is 0.000

Chi-square approximation = 24.973 with 1 df

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1769.000
--------	----	----------

MW-1S	45	1717.000
-------	----	----------

Mann-Whitney U test statistic = 1028.000

Probability is 0.035

Chi-square approximation = 4.445 with 1 df

R

The following results are for:

PARAM\_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 81 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	37	1686.500
--------	----	----------

MW-1S	44	1634.500
-------	----	----------

Mann-Whitney U test statistic = 983.500

Probability is 0.049

Chi-square approximation = 3.860 with 1 df

R

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 83 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-15S	38	1765.000
--------	----	----------

MW-1S	45	1721.000
-------	----	----------

Mann-Whitney U test statistic = 1024.000

Probability is 0.103

Chi-square approximation = 2.663 with 1 df

A

SYSTAT Rectangular file O:\2279-111\Jan00\1-16.syd,  
created Tue Mar 28, 2000 at 10:11:26, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

## Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-16	32	1604.500
-------	----	----------

MW-1S	45	1398.500
-------	----	----------

Mann-Whitney U test statistic = 1076.500

Probability is 0.000

Chi-square approximation = 17.960 with 1 df

R

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

## Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-16	32	1239.500
-------	----	----------

MW-1S	45	1763.500
-------	----	----------

Mann-Whitney U test statistic = 711.500

Probability is 0.875

Chi-square approximation = 0.025 with 1 df

A

The following results are for:

PARAM\_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

## Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-16	32	1253.000
-------	----	----------

MW-1S	45	1750.000
-------	----	----------

Mann-Whitney U test statistic = 725.000

Probability is 0.950

Chi-square approximation = 0.004 with 1 df

A

The following results are for:

PARAM\_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

## Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-16 32 1818.000  
 MW-1S 45 1185.000  
 Mann-Whitney U test statistic = 1290.000  
 Probability is 0.000

Chi-square approximation = 37.400 with 1 df *R*

The following results are for:

PARAM\_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	32	1171.000
MW-1S	45	1832.000

MW-16 32 1171.000  
 MW-1S 45 1832.000  
 Mann-Whitney U test statistic = 643.000  
 Probability is 0.236

Chi-square approximation = 1.404 with 1 df *A*

The following results are for:

PARAM\_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	32	1939.500
MW-1S	45	1063.500

MW-16 32 1939.500  
 MW-1S 45 1063.500  
 Mann-Whitney U test statistic = 1411.500  
 Probability is 0.000  
 Chi-square approximation = 51.130 with 1 df

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	32	1226.000
MW-1S	45	1777.000

MW-16 32 1226.000  
 MW-1S 45 1777.000  
 Mann-Whitney U test statistic = 698.000  
 Probability is 0.668

Chi-square approximation = 0.184 with 1 df *A*

The following results are for:

PARAM\_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 75 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	31	1558.500
MW-1S	44	1291.500

Mann-Whitney U test statistic = 1062.500

Probability is 0.000

Chi-square approximation = 21.385 with 1 df *R*

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 77 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-16	32	1653.000
MW-1S	45	1350.000

Mann-Whitney U test statistic = 1125.000

Probability is 0.000

Chi-square approximation = 18.537 with 1 df *R*

SYSTAT Rectangular file O:\2279-111\Jan00\1-3.syd,  
created Tue Mar 28, 2000 at 10:11:58, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S 45 1807.500  
 MW-3 45 2287.500  
 Mann-Whitney U test statistic = 772.500  
 Probability is 0.017

Chi-square approximation = 5.716 with 1 df **R**

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	2047.500
MW-3	45	2047.500

Mann-Whitney U test statistic = 1012.500

Probability is 1.000

Chi-square approximation = 0.000 with 1 df **A**

The following results are for:

PARAM\_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	2116.500
MW-3	45	1978.500

Mann-Whitney U test statistic = 1081.500

Probability is 0.474

Chi-square approximation = 0.512 with 1 df **A**

The following results are for:

PARAM\_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1617.500
MW-3	45	2477.500

Mann-Whitney U test statistic = 582.500

Probability is 0.000

Chi-square approximation = 13.640 with 1 df **R**

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MW-3	45	2068.500
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MW-3	45	2887.000
------	----	----------

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Chi-square approximation = 45.938 with 1 df

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MW-3	45	2090.000
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Group	Count	Rank Sum
MW-1S	44	1180.000
MW-4	44	2736.000

Mann-Whitney U test statistic = 190.000

Probability is 0.000

Chi-square approximation = 47.360 with 1 df R

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1109.500
MW-4	45	2985.500

Mann-Whitney U test statistic = 74.500

Probability is 0.000

Chi-square approximation = 58.892 with 1 df R

SYSTAT Rectangular file O:\2279-111\Jan00\1-6B.syd,  
created Tue Mar 28, 2000 at 10:13:22, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1915.500
MW-6B	41	1825.500

Mann-Whitney U test statistic = 880.500

Probability is 0.629

Chi-square approximation = 0.233 with 1 df A

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1912.500
-------	----	----------

MW-6B	41	1828.500
-------	----	----------

Mann-Whitney U test statistic = 877.500

Probability is 0.544

Chi-square approximation = 0.368 with 1 df

A

The following results are for:

PARAM\_ID\$ = CU

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	2054.500
-------	----	----------

MW-6B	41	1686.500
-------	----	----------

Mann-Whitney U test statistic = 1019.500

Probability is 0.274

Chi-square approximation = 1.198 with 1 df

A

The following results are for:

PARAM\_ID\$ = EBN

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1694.000
-------	----	----------

MW-6B	41	2047.000
-------	----	----------

Mann-Whitney U test statistic = 659.000

Probability is 0.014

Chi-square approximation = 5.996 with 1 df

R

The following results are for:

PARAM\_ID\$ = HCR

Categorical values encountered during processing are:  
 WELL\$ (2 levels)  
 MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases  
 Dependent variable is VALUE  
 Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	2016.500
-------	----	----------

MW-6B	41	1724.500
-------	----	----------

Mann-Whitney U test statistic = 981.500

Probability is 0.463

Chi-square approximation = 0.540 with 1 df

A

The following results are for:

PARAM\_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	2119.500
-------	----	----------

MW-6B	41	1621.500
-------	----	----------

Mann-Whitney U test statistic = 1084.500

Probability is 0.161

Chi-square approximation = 1.964 with 1 df

A

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1771.000
-------	----	----------

MW-6B	41	1970.000
-------	----	----------

Mann-Whitney U test statistic = 736.000

Probability is 0.026

Chi-square approximation = 4.936 with 1 df

R

The following results are for:

PARAM\_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 84 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1658.500
-------	----	----------

MW-6B	40	1911.500
-------	----	----------

Mann-Whitney U test statistic = 668.500

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Probability is 0.029

Chi-square approximation = 4.795 with 1 df

R

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1800.000
-------	----	----------

MW-6B	41	1941.000
-------	----	----------

Mann-Whitney U test statistic = 765.000

Probability is 0.141

Chi-square approximation = 2.165 with 1 df

A

SYSTAT Rectangular file O:\2279-111\Jan00\1-7.syd,  
created Tue Mar 28, 2000 at 10:14:00, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1683.500
-------	----	----------

MW-7	45	2411.500
------	----	----------

Mann-Whitney U test statistic = 648.500

Probability is 0.001

Chi-square approximation = 11.404 with 1 df

R

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S 45 1987.000  
 MW-7 45 2108.000  
 Mann-Whitney U test statistic = 952.000  
 Probability is 0.474

Chi-square approximation = 0.513 with 1 df

A

The following results are for:

PARAM\_ID\$ = CU

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1805.000
-------	----	----------

MW-7	45	2290.000
------	----	----------

Mann-Whitney U test statistic = 770.000

Probability is 0.028

Chi-square approximation = 4.814 with 1 df

R

The following results are for:

PARAM\_ID\$ = EBN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1663.500
-------	----	----------

MW-7	45	2431.500
------	----	----------

Mann-Whitney U test statistic = 628.500

Probability is 0.001

Chi-square approximation = 11.086 with 1 df

R

The following results are for:

PARAM\_ID\$ = HCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	2063.500
-------	----	----------

MW-7	45	2031.500
------	----	----------

Mann-Whitney U test statistic = 1028.500

Probability is 0.856

Chi-square approximation = 0.033 with 1 df

The following results are for:

PARAM\_ID\$ = TCE

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1089.000
MW-7	45	3006.000

Mann-Whitney U test statistic = 54.000

Probability is 0.000

Chi-square approximation = 59.869 with 1 df

R

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1943.500
MW-7	45	2151.500

Mann-Whitney U test statistic = 908.500

Probability is 0.219

Chi-square approximation = 1.511 with 1 df

A

The following results are for:

PARAM\_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 88 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	44	1683.500
MW-7	44	2232.500

Mann-Whitney U test statistic = 693.500

Probability is 0.004

Chi-square approximation = 8.292 with 1 df

R

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1892.500
MW-7	45	2202.500

Mann-Whitney U test statistic = 857.500  
 Probability is 0.177  
 Chi-square approximation = 1.825 with 1 df

A

SYSTAT Rectangular file O:\2279-111\Jan00\1-9.syd,  
 created Tue Mar 28, 2000 at 10:14:30, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

The following results are for:

PARAM\_ID\$ = BEN

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1357.000
MW-9	45	2738.000

Mann-Whitney U test statistic = 322.000  
 Probability is 0.000  
 Chi-square approximation = 34.891 with 1 df

R

The following results are for:

PARAM\_ID\$ = CD

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 90 cases

Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	2008.000
MW-9	45	2087.000

Mann-Whitney U test statistic = 973.000  
 Probability is 0.632  
 Chi-square approximation = 0.229 with 1 df

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WELL\$ (2 levels)  
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 90 cases  
Dependent variable is VALUE  
Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1044.500
MW-9	45	3050.500

Mann-Whitney U test statistic = 9.500

Probability is 0.000

Chi-square approximation = 65.544 with 1 df

R

The following results are for:

PARAM\_ID\$ = TCR

Categorical values encountered during processing are:

WELL\$ (2 levels)  
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 90 cases  
Dependent variable is VALUE  
Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	45	1728.000
MW-9	45	2367.000

Mann-Whitney U test statistic = 693.000

Probability is 0.001

Chi-square approximation = 10.665 with 1 df

R

The following results are for:

PARAM\_ID\$ = TOL

Categorical values encountered during processing are:

WELL\$ (2 levels)  
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 88 cases  
Dependent variable is VALUE  
Grouping variable is WELL\$

Group	Count	Rank Sum
-------	-------	----------

MW-1S	44	1245.000
MW-9	44	2671.000

Mann-Whitney U test statistic = 255.000

Probability is 0.000

Chi-square approximation = 40.096 with 1 df

R

The following results are for:

PARAM\_ID\$ = TX

Categorical values encountered during processing are:

WELL\$ (2 levels)  
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 90 cases  
Dependent variable is VALUE

Grouping variable is WELL\$

Group	Count	Rank Sum
MW-1S	45	1313.000
MW-9	45	2782.000

Mann-Whitney U test statistic = 278.000  
Probability is 0.000  
Chi-square approximation = 36.976 with 1 df *R*

Appendix E-3  
Parametric ANOVA Results



IMPORT successfully completed.

808 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-11.SYD,  
created Tue Mar 28, 2000 at 13:48:32, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-11, MW-1S

Dep Var: HD\_VALUE N: 90 Multiple R: 0.578 Squared multiple R: 0.334

Estimates of effects  $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		121.266
WELL\$	MW-11	108.957

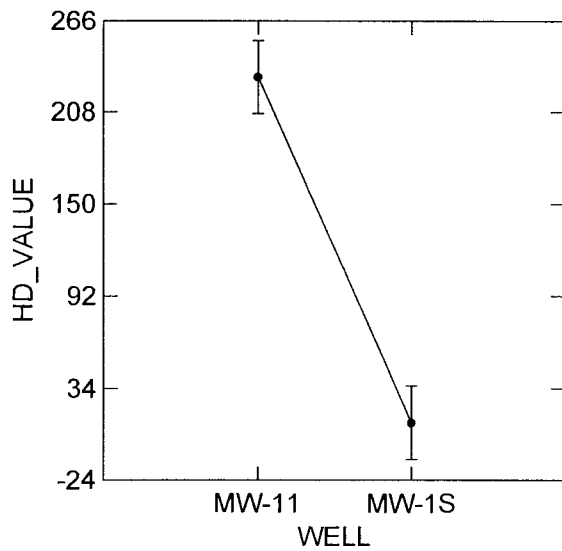
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	1068439.969	1	1068439.969	44.110	0.000
Error	2131561.634	88	24222.291		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-11	230.222	23.201	45
WELL\$	=MW-1S	12.309	23.201	45

## Least Squares Means



\*\*\* WARNING \*\*\*

Case 765 is an outlier (Studentized Residual = 3.520)  
 Case 801 is an outlier (Studentized Residual = 4.175)

Durbin-Watson D Statistic 1.508

First Order Autocorrelation 0.234

COL/

ROW WELLS

1 MW-11

2 MW-1S

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 24222.291 with 88 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-217.913	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

```
(PARAM_ID$= "TCE")
```

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELLS (2 levels)

MW-11, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU      N: 88      Multiple R: 0.713      Squared multiple R: 0.508

Estimates of effects  $B = (X'X)^{-1} X'Y$

HD\_LN\_VALU

CONSTANT	3.577
----------	-------

WELL\$	MW-11	1.128
--------	-------	-------

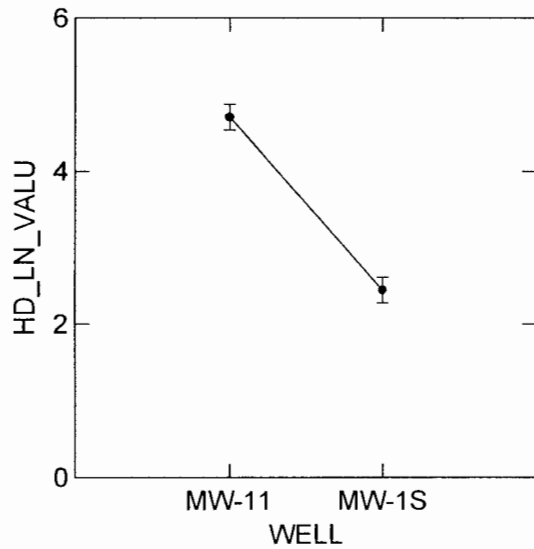
## Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	111.875	1	111.875	88.728	0.000
Error	108.435	86	1.261		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-11	4.704	0.169	44
WELL\$	=MW-1S	2.449	0.169	44

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case 121 is an outlier (Studentized Residual = -5.676)  
Case 122 is an outlier (Studentized Residual = -5.676)

Durbin-Watson D Statistic 0.946

First Order Autocorrelation 0.393

COL/

ROW WELLS

1 MW-11

2 MW-1S

Using least squares means.

Post Hoc test of HD\_LN\_VALU

Using model MSE of 1.261 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-2.255	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

**Abstract**



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**Abstract**

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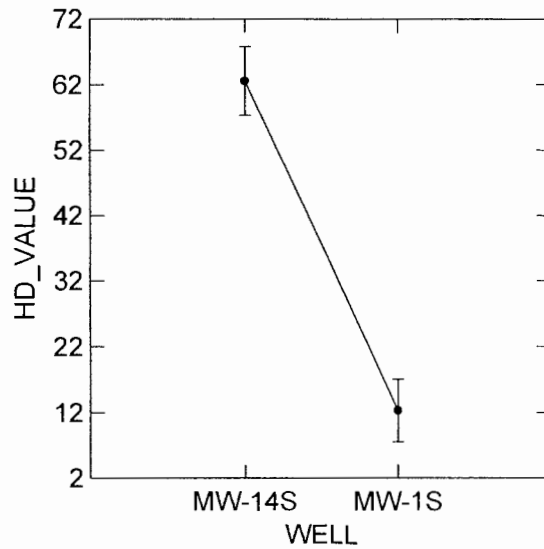
10

**Abstract**

**Abstract**

10

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case	102 is an outlier	(Studentized Residual =	4.064)
Case	711 is an outlier	(Studentized Residual =	4.064)
Case	729 is an outlier	(Studentized Residual =	6.544)

Durbin-Watson D Statistic 1.619

First Order Autocorrelation 0.177

COL/

ROW WELLS

1 MW-14S

2 MW-1S

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 1024.944 with 80 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-50.232	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

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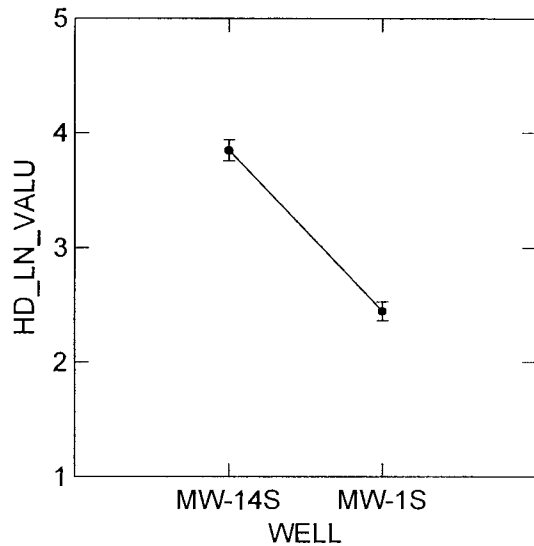
530

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## Least Squares Means




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Durbin-Watson D Statistic 1.320  
 First Order Autocorrelation 0.311  
 COL/

ROW WELL\$  
 1 MW-14S  
 2 MW-1S

Using least squares means.  
 Post Hoc test of HD\_LN\_VALU

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Using model MSE of 0.297 with 78 df.  
 Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-1.398	0.000

Tukey HSD Multiple Comparisons.  
 Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

---

IMPORT successfully completed.

745 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-15s.SYD,  
created Tue Mar 28, 2000 at 13:48:42, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)  
MW-15S, MW-1S

Dep Var: HD\_VALUE N: 83 Multiple R: 0.437 Squared multiple R: 0.191

Estimates of effects  $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		9.541
WELL\$	MW-15S	-2.768

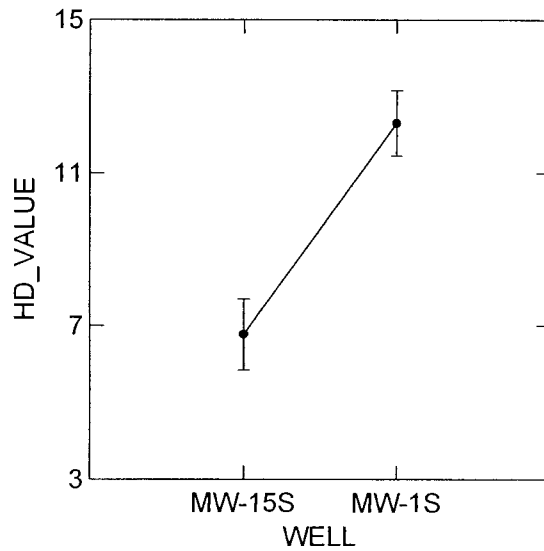
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	631.227	1	631.227	19.140	0.000
Error	2671.330	81	32.979		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-15S	6.774	0.932	38
WELL\$	=MW-1S	12.309	0.856	45

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case	102 is an outlier	(Studentized Residual =	4.094)
Case	738 is an outlier	(Studentized Residual =	3.422)

Durbin-Watson D Statistic 1.057

First Order Autocorrelation 0.463

COL/

ROW WELL\$

1 MW-15S

2 MW-1S

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 32.979 with 81 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	5.535	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

```
(PARAM ID$= "TCE")
```

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-15S, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD LN VALU    N: 81    Multiple R: 0.557    Squared multiple R: 0.311

Estimates of effects  $B = (X'X)^{-1} X'Y$

		HD_LN_VALU
CONSTANT		2.024
WELL\$	MW-15S	-0.425

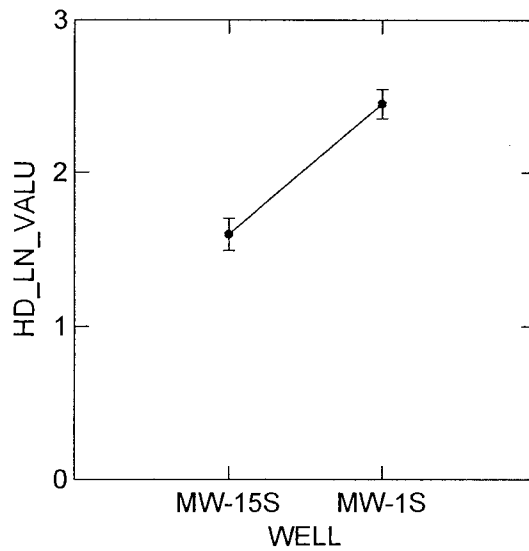
## Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	14.530	1	14.530	35.607	0.000
Error	32.237	79	0.408		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-15S	1.599	0.105	37
WELL\$	=MW-1S	2.449	0.096	44

## Least Squares Means



\*\*\* WARNING \*\*\*

Case 86 is an outlier (Studentized Residual = -3.961)

Durbin-Watson D Statistic 0.693

First Order Autocorrelation 0.571

COL/

ROW WELLS

1 MW-15S

2 MW-1S

Using least squares means.

Post Hoc test of HD\_LN\_VALU

Using model MSE of 0.408 with 79 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	0.850	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

691 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-16.SYD,  
created Tue Mar 28, 2000 at 13:48:46, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELLS (2 levels)  
MW-16, MW-15

Dep Var: HD\_VALUE    N: 77    Multiple R: 0.722    Squared multiple R: 0.521

Estimates of effects  $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		27.936
WELLS	MW-16	15.627

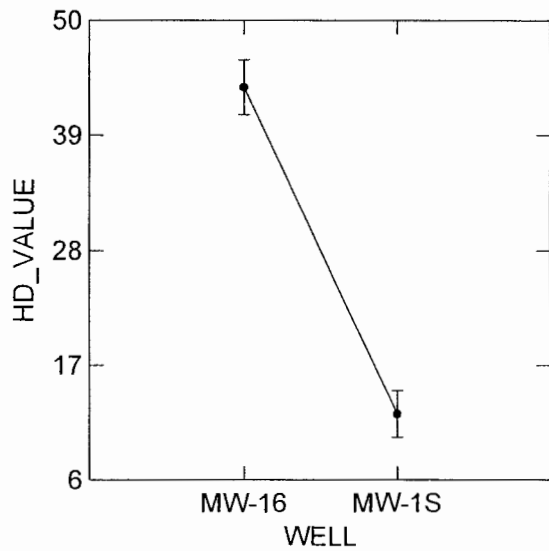
## Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	18267.208	1	18267.208	81.597	0.000
Error	16790.231	75	223.870		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-16	43.563	2.645	32
WELL\$	=MW-1S	12.309	2.230	45

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case 66 is an outlier (Studentized Residual = 3.447)  
Case 439 is an outlier (Studentized Residual = 5.250)

Durbin-Watson D Statistic 1.384

First Order Autocorrelation 0.283

COL/

ROW WELL\$

1 MW-16

2 MW-1S

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 223.870 with 75 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-31.254	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-16, MW-1S

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU N: 75 Multiple R: 0.787 Squared multiple R: 0.619

$$\text{Estimates of effects } B = (X'X)^{-1} X'Y$$

	HD_LN_VALU
CONSTANT	3.052
WELL\$ MW-16	0.603

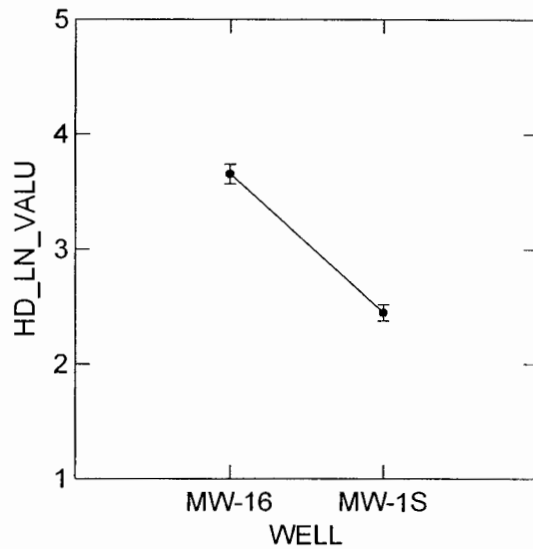
## Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	26.420	1	26.420	118.476	0.000
Error	16.279	73	0.223		

## Least squares means.

		LS Mean	SE	N
WELL\$	=MW-16	3.654	0.085	31
WELL\$	=MW-1S	2.449	0.071	44

## Least Squares Means



Durbin-Watson D Statistic	1.247
First Order Autocorrelation	0.347

COL/

ROW WELL\$

1 MW-16

2 MW-1S

Using least squares means.

Post Hoc test of HD\_LN\_VALU

Using model MSE of 0.223 with 73 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-1.205	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

808 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-3.SYD,  
created Tue Mar 28, 2000 at 13:48:50, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:  
WELL\$ (2 levels)  
MW-1S, MW-3

Dep Var: HD\_VALUE N: 90 Multiple R: 0.547 Squared multiple R: 0.299

Estimates of effects  $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		32.360
WELL\$	MW-1S	-20.051

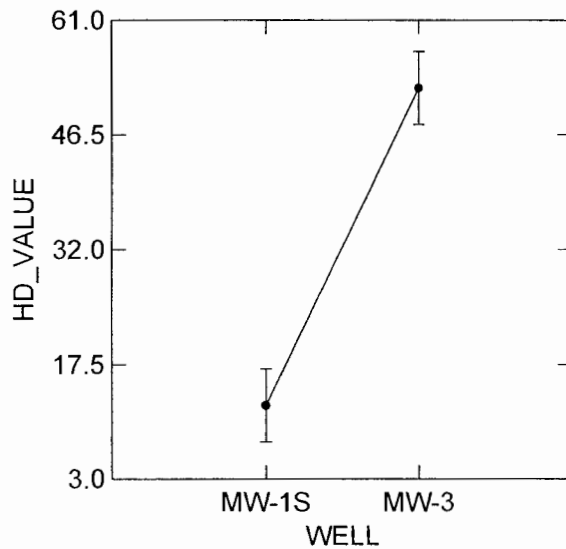
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	36184.235	1	36184.235	37.619	0.000
Error	84644.001	88	961.864		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	12.309	4.623	45
WELL\$	=MW-3	52.411	4.623	45

## Least Squares Means



\*\*\* WARNING \*\*\*

```
Case      784 is an outlier      (Studentized Residual =      4.177)
Case      802 is an outlier      (Studentized Residual =      4.177)
```

Durbin-Watson D Statistic 1.062

First Order Autocorrelation 0.387

COL/

ROW WELL\$

1 MW-1S

2 MW-3

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 961.864 with 88 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	40.102	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-3

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU    N: 88    Multiple R: 0.670    Squared multiple R: 0.449

Estimates of effects  $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	3.027
WELL\$      MW-1S	-0.578

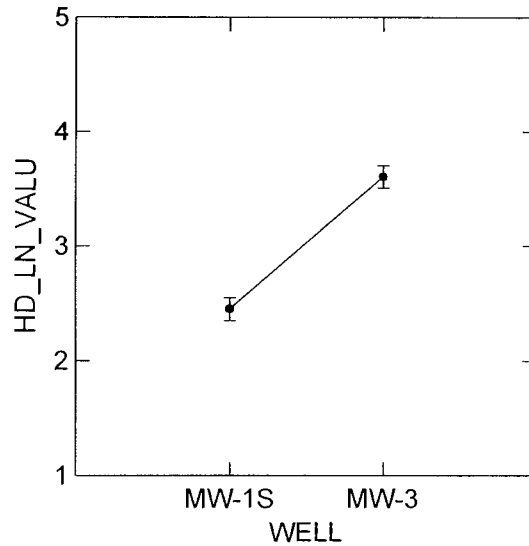
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	29.421	1	29.421	69.972	0.000
Error	36.161	86	0.420		

#### Least squares means.

	LS Mean	SE	N
WELL\$      =MW-1S	2.449	0.098	44
WELL\$      =MW-3	3.605	0.098	44

## Least Squares Means




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Durbin-Watson D Statistic 1.204  
 First Order Autocorrelation 0.359  
 COL/

ROW WELLS

1 MW-1S

2 MW-3

Using least squares means.

Post Hoc test of HD\_LN\_VALU

---

Using model MSE of 0.420 with 86 df.  
 Matrix of pairwise mean differences:

	1	2
1	0.000	
2	1.156	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

---

IMPORT successfully completed.

808 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-4.SYD,  
created Tue Mar 28, 2000 at 13:48:54, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)  
MW-1S, MW-4

Dep Var: HD\_VALUE N: 90 Multiple R: 0.849 Squared multiple R: 0.721

Estimates of effects  $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	104.199
WELL\$ MW-1S	-91.890

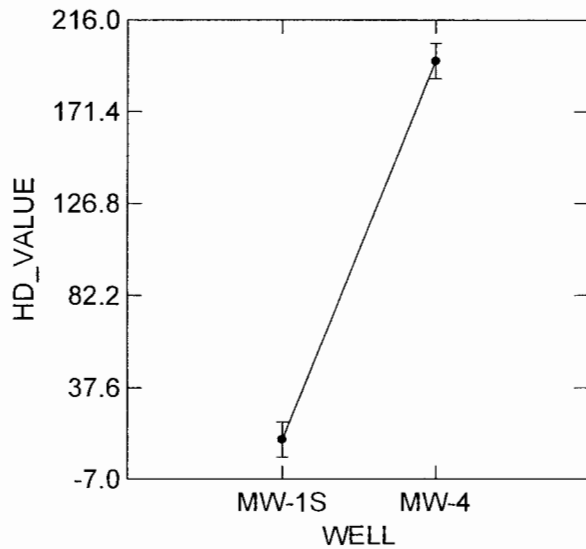
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	759939.489	1	759939.489	227.031	0.000
Error	294562.001	88	3347.295		

#### Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	12.309	8.625	45
WELL\$	=MW-4	196.089	8.625	45

## Least Squares Means



\*\*\* WARNING \*\*\*

Case 358 is an outlier (Studentized Residual = 3.614)

Durbin-Watson D Statistic 1.080

First Order Autocorrelation 0.458

COL/

ROW WELLS

1 MW-1S

2 MW-4

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 3347.295 with 88 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	183.780	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-4

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU      N: 88      Multiple R: 0.932      Squared multiple R: 0.868

Estimates of effects  $B = (X'X)^{-1} X'Y$

HD\_LN\_VALU

CONSTANT	3.795
----------	-------

WELL\$	MW-1S	-1.346
--------	-------	--------

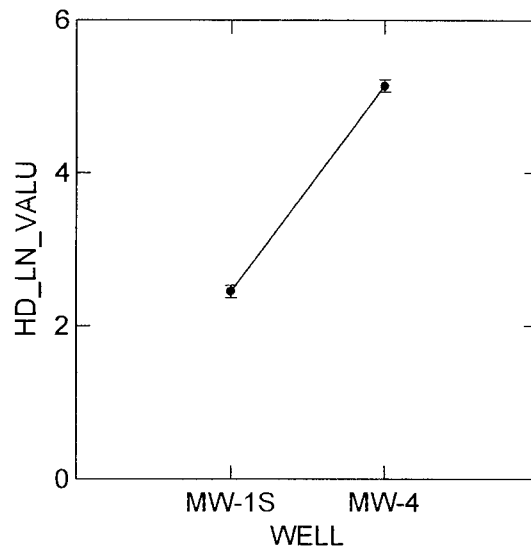
## Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	159.511	1	159.511	566.870	0.000
Error	24.200	86	0.281		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.449	0.080	44
WELL\$	=MW-4	5.142	0.080	44

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case 336 is an outlier (Studentized Residual = -3.969)  
 Case 712 is an outlier (Studentized Residual = -3.969)

Durbin-Watson D Statistic 1.550

First Order Autocorrelation 0.214

COL/

ROW WELL\$

1 MW-1S

2 MW-4

Using least squares means.

Post Hoc test of HD\_LN\_VALU

Using model MSE of 0.281 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	2.693	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-6B.SYD,  
created Tue Mar 28, 2000 at 13:49:00, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
--------	------------	-------	----------	----------	------------

Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)  
MW-1S, MW-6B

Dep Var: HD\_VALUE    N: 86    Multiple R: 0.162    Squared multiple R: 0.026

Estimates of effects  $B = (X'X)^{-1} X'Y$

	HD_VALUE
CONSTANT	14.415
WELL\$      MW-1S	-2.107

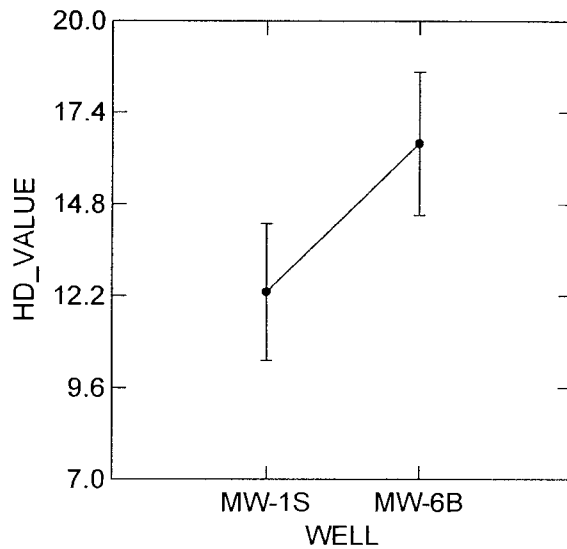
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	380.797	1	380.797	2.259	0.137
Error	14161.247	84	168.586		

#### Least squares means.

	LS Mean	SE	N
WELL\$      =MW-1S	12.309	1.936	45
WELL\$      =MW-6B	16.522	2.028	41

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case	333 is an outlier	(Studentized Residual =	3.342)
Case	334 is an outlier	(Studentized Residual =	3.531)
Case	335 is an outlier	(Studentized Residual =	3.724)

Durbin-Watson D Statistic 0.543

First Order Autocorrelation 0.727

COL/

ROW WELL\$

1 MW-1S

2 MW-6B

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 168.586 with 84 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	4.213	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.137	1.000

Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-6B

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU N: 84 Multiple R: 0.113 Squared multiple R: 0.013

Estimates of effects  $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	2.355
WELL\$ MW-1S	0.094

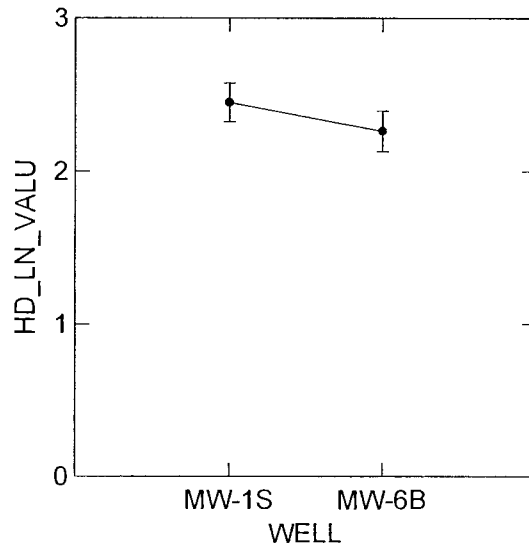
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	0.739	1	0.739	1.060	0.306
Error	57.167	82	0.697		

#### Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.449	0.126	44
WELL\$	=MW-6B	2.261	0.132	40

## Least Squares Means




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Durbin-Watson D Statistic 0.819

First Order Autocorrelation 0.586

COL/

ROW WELLS

1 MW-1S

2 MW-6B

Using least squares means.

Post Hoc test of HD\_LN\_VALU

---

Using model MSE of 0.697 with 82 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-0.188	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.306	1.000

---

IMPORT successfully completed.

808 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jan00\1-7.SYD,  
created Tue Mar 28, 2000 at 13:49:04, contains variables:

WELL\$	PARAM_ID\$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU
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Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:  
WELL\$ (2 levels)  
MW-1S, MW-7

Dep Var: HD\_VALUE N: 90 Multiple R: 0.708 Squared multiple R: 0.502

Estimates of effects  $B = (X'X)^{-1} X'Y$

		HD_VALUE
CONSTANT		40.263
WELL\$	MW-1S	-27.954

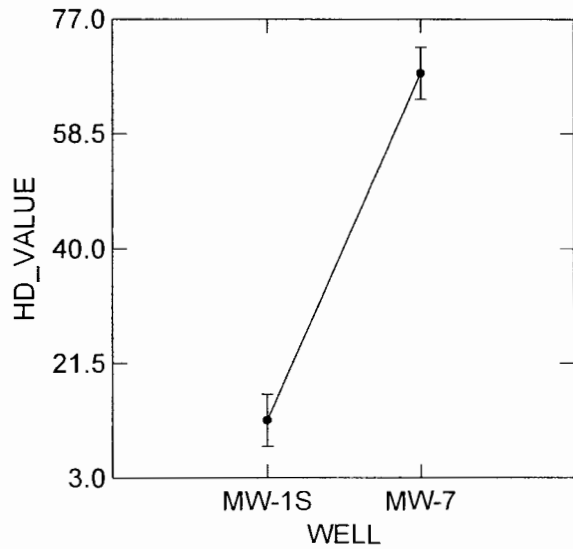
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	70330.587	1	70330.587	88.660	0.000
Error	69806.662	88	793.258		

Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	12.309	4.199	45
WELL\$	=MW-7	68.218	4.199	45

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case 448 is an outlier (Studentized Residual = 3.946)  
 Case 730 is an outlier (Studentized Residual = 3.500)

Durbin-Watson D Statistic 1.406

First Order Autocorrelation 0.293

COL/

ROW WELL\$

1 MW-1S

2 MW-7

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 793.258 with 88 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	55.909	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-7

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU N: 88 Multiple R: 0.773 Squared multiple R: 0.598

Estimates of effects  $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	3.221
WELL\$ MW-1S	-0.772

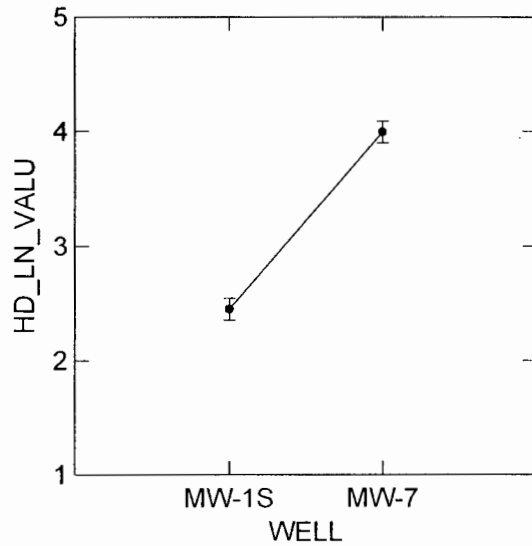
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	52.474	1	52.474	127.839	0.000
Error	35.300	86	0.410		

#### Least squares means.

		LS Mean	SE	N
WELL\$	=MW-1S	2.449	0.097	44
WELL\$	=MW-7	3.993	0.097	44

## Least Squares Means



\*\*\* WARNING \*\*\*

Case 336 is an outlier (Studentized Residual = -6.561)

Durbin-Watson D Statistic 1.702

First Order Autocorrelation 0.131

COL/

ROW WELL\$

1 MW-1S

2 MW-7

Using least squares means.

Post Hoc test of HD\_LN\_VALU

Using model MSE of 0.410 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	1.544	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

**Abstract**

100

**Figure 1**

100

12

1

1999

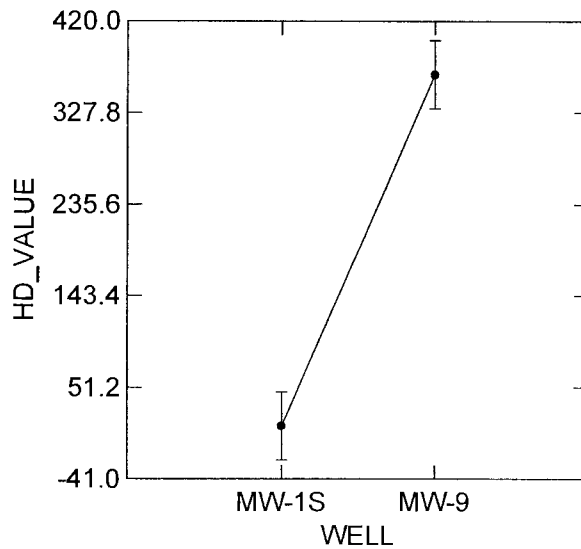
100

**Abstract**

100

**Abstract**

## Least Squares Means



## \*\*\* WARNING \*\*\*

Case	359 is an outlier	(Studentized Residual =	3.416)
Case	694 is an outlier	(Studentized Residual =	4.540)
Case	712 is an outlier	(Studentized Residual =	3.960)

Durbin-Watson D Statistic 1.325

First Order Autocorrelation 0.333

COL/

ROW WELLS

1 MW-1S

2 MW-9

Using least squares means.

Post Hoc test of HD\_VALUE

Using model MSE of 52882.374 with 88 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	354.069	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:  
(PARAM\_ID\$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:

WELL\$ (2 levels)

MW-1S, MW-9

2 case(s) deleted due to missing data.

Dep Var: HD\_LN\_VALU N: 88 Multiple R: 0.844 Squared multiple R: 0.712

Estimates of effects  $B = (X'X)^{-1} X'Y$

	HD_LN_VALU
CONSTANT	3.874
WELL\$ MW-1S	-1.425

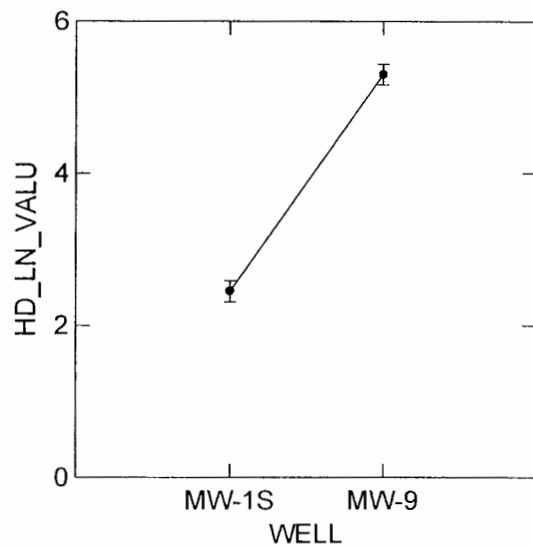
#### Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL\$	178.620	1	178.620	212.286	0.000
Error	72.361	86	0.841		

#### Least squares means.

	LS Mean	SE	N
WELL\$ =MW-1S	2.449	0.138	44
WELL\$ =MW-9	5.298	0.138	44

## Least Squares Means



Durbin-Watson D Statistic	1.261
First Order Autocorrelation	0.365

COL/

ROW WELLS

1 MW-1S

2 MW-9

Using least squares means.

Post Hoc test of HD LN VALU

Using model MSE of 0.841 with 86 df.

Matrix of pairwise mean differences:

	1	2
1	0.000	
2	2.849	0.000

Tukey HSD Multiple Comparisons.

Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000